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CROP REPORT.

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1907

Corn as a grain crop.

Plum culture.

Hatching and rearing chicks.

Bee keeping.

Bird protection.

Greenhouse pests.

SERIES OF 1907. VOL. 20. NO. 1.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF MAY, 1907.

CORN AS A GRAIN CROP.

ISSUED MONTHLY, MAY TO OCTOBER, BY STATE BOARD OF AGRICULTURE, STATE HOUSE, BOSTON, MASS.

J. LEWIS ELLSWORTH, *Secretary.*

ENTERED JUNE 3, 1904, AT BOSTON, MASS., AS SECOND-CLASS MATTER, UNDER ACT OF CONGRESS OF JUNE 6, 1900.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1907.

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Approved by
The State Board of Publication.

Crop Report for the Month of May, 1907.

Office of State Board of Agriculture,
Boston, Mass., June 1, 1907.

The first monthly crop bulletin of the year is presented herewith. These bulletins will be issued through the coming season until November 1, and will, as in former years, contain information in regard to crop and climatic conditions, both in Massachusetts and the country at large, with selected reports of correspondents, and a special article on some subject of timely interest in each bulletin. The article for the present issue is on "Corn as a Grain Crop in Massachusetts," by Prof. Wm. P. Brooks, director of the Massachusetts Agricultural Experiment Station. It is hoped that this article may awaken more interest in this splendid grain crop, and convince some of our farmers of its importance in any practical rotation for New England farms.

Progress of the Season.

The Crop Reporting Board of the Bureau of Statistics of the United States Department of Agriculture (Crop Reporter for May, 1907) finds the area under winter wheat remaining in cultivation May 1 to have been about 28,132,000 acres, 11 per cent less than the area sown last fall, and 5 per cent less than the area harvested last year. The average condition of the growing winter-wheat crop on May 1 was 82.9, as compared with 89.9 a month earlier, 90.9 on May 1, 1906, 92.5 in 1905, and 85.5, the mean of the May averages of the last ten years.

The average condition of winter rye on May 1 was 88, as compared with 92 on April 1, 89.9 on May 1, 1906, 93.5 in 1905, and 89.5, the mean of the May averages of the last ten years.

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The average condition of meadow mowings lands on May 1 was 83.6, against 92 on May 1, 1906, 93.3 in 1905, and 90.4, the mean of the May averages of the last ten years.

The average condition of spring pastures on May 1 was 79.6, as against 91.4 on May 1, 1906, 92.3 in 1905, and 89.2, the mean of the May averages of the last ten years.

Of the total acreage of spring plowing contemplated, 71.5 per cent was reported as actually done on May 1, as compared with 63.9 per cent last year, and a ten-year average of 65.

Of spring planting, 47 per cent was reported as having been accomplished, as compared with 53 per cent in 1906.

In Massachusetts the average condition of winter rye was given as 88; the average condition of meadow mowings lands as 90; the average condition of spring pasture as 85; the percentage of spring plowing actually done as 25; and the proportion of spring planting done as 11.

Weather Summary, Jan. 1 to May 1, 1907.

[Furnished by Weather Bureau, Boston.]

January: The weather was of mid-winter type, without special features. There were the usual number of storms of average severity, with rain and snow, the monthly amounts being somewhat below the average. Some of the storms were accompanied with high winds and gales. The mean temperature, 29.4°, was about 1° below normal. During the first nine days the temperatures were above the average; from the 10th to the 22d the temperatures were very variable; after which the weather continued very cold until the close of the month.

February: The low temperatures continued through February, the low average temperature making the month one of the coldest of its name on record, though the extremes did not depart greatly from previous years. The precipitation was nearly all snow, the total snowfall ranging from 11 to 36 inches. The most severe storm occurred on the 5th, and was accompanied with severe northeast gales, reaching velocities from 60 to 70 miles per hour. The month as a whole was a very severe one.

March: The weather was more moderate than usual. There were but two storms of noticeable severity. The snowfall was quite unevenly distributed, and the average temperature ranged from 1° to 4° above the average for March. The minimum temperatures of the first decade were low, and the maximum temperatures during the closing days of the month were high for the season. At the close of the month the ground was free from snow.

April: The month as a whole was very unseasonable, with weather conditions more like those of March than April. The daily temperatures were almost continuously low, and the monthly average from 1° to 4° below the April normal. There was much cloudiness, and precipitation occurred on an average of ten days. There was a heavy fall of snow on the 8th, 9th and 10th, ranging from 2 to 18 inches. The month closed with the season from ten days to a fortnight later than usual.

Temperature and Rainfall for the Whole Country.

[From United States National Weekly Weather Bulletin.]

Week ending May 7. — Abnormally cold weather continued during the week, over the greater part of the country, the north Pacific coast region and the South Atlantic and East Gulf States being the only districts in which the mean temperature was above the normal. In the Lake region, central valleys and Rocky Mountain district, the average daily deficiency ranged from 6° to 18°, and in the Middle Atlantic States and New England from 1° to 4°. The rainfall was very heavy from the central Gulf coast northward to the upper Mississippi valley, and there was more than the average over the southern part of the upper Lake region and in the lower Lake region. Over the greater part of the interior of the Middle and South Atlantic States and in the upper Ohio valley there was less than the average rainfall.

Week ending May 13. — The temperature was above the normal on the south Atlantic coast and over portions of the northern Plateau and north Pacific coast regions, and nearly normal conditions prevailed on the west Gulf and middle Pacific coasts. Elsewhere the mean temperature was below

the normal, the deficiency being most marked in the northern districts from the Dakotas eastward to the upper Lake region and in northern New England. On the middle Atlantic coast and generally through the Southern States the precipitation was above the normal. Over the middle Rocky Mountain slope, generally throughout the Missouri valley, and in the upper Mississippi and Ohio valleys, Lake region and northern New England, there was less than the average precipitation.

Week ending May 20. — The week was warmer than usual in southern New England, the Middle Atlantic States and the eastern portions of the Lake region, also in the northern and middle Plateau regions and on the Pacific coast. Throughout the central valleys and Southern States the week was colder than usual. Heavy rains occurred over an area extending from the central and east Gulf coasts northward to the central Mississippi, lower Ohio and lower Missouri valleys. There was more than the average in the northern portion of the upper Lake region and in some of the immediate coast districts from North Carolina to New England. In the lower Lake region and upper Ohio valley, and over most of the interior of the Middle and South Atlantic States, the rainfall was below the average.

Week ending May 27. — The mean temperature was slightly above normal in Florida and on the east Gulf coast, in eastern Kansas and on the immediate Pacific coast. From the west Gulf coast and Rio Grande valley northward to the middle Rocky Mountain slope nearly normal conditions prevailed. Elsewhere the mean temperatures were decidedly below the normal, the week averaging decidedly cold in all northern districts from the Rocky Mountains to the New England coast. Very heavy rains occurred in the central and west Gulf districts and from the northern Rocky Mountain region eastward to the lower Lake region. Generally throughout the Atlantic coast districts, except in portions of the South Atlantic States, the precipitation was below the average, only very light showers occurring in New England and the Middle Atlantic States.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending May 6. — New England. Boston: The weather continued unseasonably cold. Ice formed and ground froze in places throughout the section on the 5th. The precipitation was well distributed and sufficient. There was considerable cloudiness.

Week ending May 13. — New England. Boston: The weather continued cold, with frost. Freezing temperatures were general on the morning of the 12th. The precipitation was below the normal in the northern portion and above the normal in the southern portion. Snow occurred on the 11th over the greater part of the section, having fallen to a depth of 2 inches in Vermont. The sunshine was nearly normal.

Week ending May 20. — New England. Boston: The mean temperature was generally seasonable. A general rain occurred on the 16th and 17th; otherwise, the week was fair, except on the 19th, when local showers occurred. The precipitation was below the normal in eastern Maine and in Vermont, and above normal in central Massachusetts and parts of Connecticut, where there was more than 2 inches. The first two days were generally clear, but there was much cloudiness during the remainder of the week.

Week ending May 27. — New England. Boston: The weather was fair, except during the last two days, when light rain occurred. The temperature was low, frosts being general from the 21st to 25th inclusive, except on the coast and in Rhode Island and Connecticut. The precipitation was below the normal and the sunshine above.

The Weather of May, 1907.

The month opened with seasonable weather, May Day being quite pleasant, with temperatures ranging in the 70's. There was, however a marked drop in the temperature on the 2d, and the weather continued very cool till the 9th. On the 5th frosts were general, except in immediate coast sections, and in many interior localities thin ice formed and the ground froze in places. From the 10th to the 20th the

weather was seasonal, with the daily temperatures ranging from normal to 10° above. The warmest days were the 14th, 16th and 19th, when the mercury during the day time ranged in the 80's. The remainder of the month was unusually cool, with the day temperatures in the 60's and the nights 40° or lower. Light to moderate frosts occurred on several nights in many sections, particularly on the 21st and the 22d. For the month as a whole there was a deficiency in sunshine. Showers fell on an average on twelve days, although the monthly precipitation was generally deficient in amount. The weather was also rather blustering, there being a number of days with brisk to high winds. The general cloudiness, combined with the low temperatures, caused the month to be one of the most unpleasant of its name. At its close the season was from ten days to a fortnight late.

In the circular to correspondents, returnable May 24, the following questions were asked: —

1. How does the season compare, agriculturally speaking, with a normal season?
2. What is the promise for pastures and mowings, and did fall seeding winter well?
3. How did the bloom of apples, pears, peaches, plums and small fruits compare with the bloom of former years, and has it suffered from frosts?
4. What insects appear to be doing the most damage in your locality?
5. How is planting progressing?
6. Is farm help scarce or plenty, and what proportion can be called good help?
7. What are the average wages paid farm help in your vicinity, with board? Without board?
8. Will there be any marked change in the acreage of the usual farm crops, particularly corn and potatoes, and do you note any new enterprises in the line of agriculture?

Returns were received from 149 correspondents, and from them the following summary has been compiled: —

The Season.

April was a cold and unpleasant month, conditions more like those ordinarily found in March prevailing during the greater part of the month. May therefore opened backward, and the cold, stormy weather of the month has still further retarded agricultural operations, the fruit bloom and the development of vegetation. Correspondents unite in saying that the season is from one to two weeks later than usual, some even saying three weeks. There has been much cloudy, unpleasant weather, and the rainfall, though not heavy, was well distributed and kept the ground well moistened. Several light to severe frosts occurred, ice forming in some sections half an inch thick on several mornings.

Pastures and Mowings.

Grass of all kinds is reported to have wintered well, fall seeding being generally reported as in good condition, with only a very few reports of an unfavorable nature. The cold weather has held grass back, pastures being late in starting and mowings also being backward, but with the timely rains the general effect on the grass crop has been excellent. Seldom has there been a thicker or more luxuriant undergrowth on mowings, or promise, with reasonable rains, of a better crop of hay, at this time of year. Steady warm weather will probably advance the crop very rapidly, but otherwise haying will be a week later than usual in beginning.

Fruit Bloom.

The apple bloom appears to be an average one for the non-bearing year, as it is in most sections, but was delayed in appearing, so that it was not fully out at time of making returns. The peach bloom is very light, and many peach trees are reported killed by the severe winter. Pears and plums show a light bloom, and cherries do not appear to be exceptionally heavy. Small fruits and berries bloomed well, where bloom had appeared; but raspberries and blackberries were reported as winter-killed. The frosts of the

month did not apparently do much damage to fruit bloom, though it is still too early to predict final results, except that strawberries were considerably damaged in eastern sections.

Insects.

Few insects had appeared at the time of making returns, and those present were doing little damage. Tent caterpillars were those most frequently reported. Other insects mentioned were currant worms, potato bugs, cut worms, white grubs, gypsy and brown-tail moth caterpillars and the San José scale. This latter pest was reported as doing damage and killing trees in a number of sections. There is no question but that it has become a serious menace to our orchards. Nature Leaflet No. 33, issued by this Board, deals with the best methods of combating it.

Planting.

Planting had progressed slowly, and was not up with the usual normal at the time of making returns. Though the weather was in the main favorable for working the soil, the soil itself in many cases remained too cold for successful planting, and the weather conditions were not such as to encourage farmers to hurry their crops in. Those who planted early either had their crops nipped by frost, or found that they germinated poorly and made little progress after appearing above the ground.

Farm Help and Wages.

Never has farm help been reported so difficult to secure as this season. The question as to quality has become secondary in many cases, any kind of help being gladly engaged. The proportions of good and poor help remain relatively about the same as in other years. Wages appear to be somewhat higher than formerly, $22 per month with board being perhaps a fair average, and $30 without board, but with tenement, milk and fuel. There is little help hired by the month except under these conditions, the week or day being the basis for payment where the laborer houses him-

self. Day wages appear to have reached a minimum of $1.50 per day, with $1.75 and $2 paid in many cases. A considerable number of correspondents report that day help is impossible to secure at any price.

Acreage of Farm Crops.

Owing to the scarcity and high price of help, it seems certain that the acreage of cultivated crops will be considerably reduced, the reduction being most marked in corn and potatoes, more land being put into or left in grass than usual. The "money" crops, such as onions, tobacco and market-garden crops of various kinds, will undoubtedly show about the usual acreage. Farmers seem inclined, however, to make the crops grown for consumption on the farm those most easily managed and harvested.

NOTES OF CORRESPONDENTS.

(Returned to us May 24.)

BERKSHIRE COUNTY.

New Marlborough (E. W. Rhoades). — Very cold April and May; season ten days late. Fall seeding wintered well, and pastures and mowings are good and thick. No peach bloom; other fruit trees will bloom fairly well. No damage by insects as yet. Potatoes and gardens mostly planted; corn ground ready to plant. Help by the month is rather scarce; day help plenty, but second rate. Wages average $25 per month without board and from $35 to $40 with board, or $1.75 per day. Perhaps more corn than usual will be planted.

Monterey (Wm. S. Bidwell). — The season is backward. Pastures and mowings look fairly well, and fall seeding wintered fairly well. Very little fruit bloom as yet; probably considerable injury from frosts. Planting is progressing very slowly. Farm help is very scarce, and not over 10 per cent good. Wages average $25 per month with board and $1.75 per day without board. There will be less acreage of cultivated crops.

Becket (Wm. H. Snow). — The season is late and cold. Fall seeding wintered well, and grass in general looks well. No fruit bloom as yet. No insects are doing damage. Planting is progressing very well. Farm help is very scarce, and there is very little good help; it is almost impossible to get help that can milk. Wages average from $20 to $25 per month with board and from $30 to $40 without. There will be no marked changes in the acreage of farm crops.

West Stockbridge (J. S. Moore). — The season is very backward. Pastures and mowings look finely, fall seeding wintered well, and there is a good hay crop promised. Cherries and plums in bloom; other fruits not yet in bloom; no damage from frosts so far. No insects have appeared. But little planting has been done, except of potatoes. Farm help is scarce, and of poor quality. Wages average from $25 to $30 per month with board and $1.50 per day without. There will be about the usual acreage of crops; more milk produced than formerly.

Hancock (B. H. Goodwirch). — The season is about two weeks late. Grass looks well, but is backward. The fruit bloom is not sufficiently advanced to enable one to predict in regard to it. No insects have appeared. Much less planting than usual has been done. Farm help is scarce, and quality average. Wages average $22 per month with

board and $30 per month without board. Rather less field crops than usual will be put in.

Windsor (Harry A. Ford). — The season is at least ten days late. Pastures and mowings were never better. Fruit trees are not in bloom as yet. No insects are doing damage. Planting is progressing very slowly. Farm help is scarce. Wages average from $20 to $25 per month with board and about $40 per month without board. There will be no marked changes in the acreage of farm crops.

Cheshire (L. J. Northup). — The season is two weeks later than usual. Pastures and mowings promise well, and fall seeding wintered well. The bloom of plums was full; no other fruits in bloom. Insects have not made their appearance. Planting is late, and potatoes are now being put in. Farm help is very scarce, and only about one out of five is good help. Wages average $25 per month with board and $35 per month without board. There will be no marked changes in the acreage of farm crops.

Williamstown (S. A. Hickox). — The season is two weeks late. Pastures and mowings promise finely, and fall seeding wintered well. The fruit bloom is not out as yet. No insects have appeared. Planting is progressing slowly. Farm help is scarce, and one-fourth of it good help. Wages average $28 with board and from $35 to $40 per month without board. There will be less corn and potatoes planted than usual.

FRANKLIN COUNTY.

Monroe (D. H. Sherman). — The season is at least ten days late. Old mowings winter-killed; very little fall seeding; too early to predict definitely as to crop. No fruit trees blossomed yet; hard freeze mornings of 21st and 22d; snow squalls 20th and 21st. No insects have appeared. No planting has been done as yet. Farm help is scarce, and two-thirds of it poor. Wages range from $20 to $26 per month with board and average $1.50 per day without board. There will be a smaller acreage of field crops than usual, owing to late season.

Charlemont (J. M. J. Legate). — The season is cold and dry, and from ten days to two weeks later than average. Pastures and mowings slow in starting, but look well; fall seeding wintered very well. Fruit is just beginning to bloom; heavy bloom promised of all except peaches, No insects have shown up as yet. Very little planting has been done, except of potatoes. Farm help is very scarce, and perhaps half could be called good. Wages range from $20 to $25 per month with board and from $30 to $35 per month without board. There will be no marked changes in the acreage of farm crops.

Bernardston (R. H. Cushman). — The season is from ten days to two weeks late. Grass shows a thin stand, with not average promise; fall seeding winter-killed badly. The fruit bloom promises a full average. Tent caterpillars have appeared in unusual numbers. All planting is

late; corn planting two weeks late. Farm help is scarce, and any help that can be got good help. Wages range from $20 to $27 per month with board and average $1.50 per day without board.

Ashfield (Albert Howes). — The season is very cold and backward. Mowings and pastures promise well, but are late in starting; fall seeding wintered well. Apples and plums will blossom well; other fruits not very full. Tent caterpillars are the most abundant insect; damage very slight as yet. Farm help is very scarce; 20 per cent good help. Wages average $20 to $25 per month with board and from $1.75 to $2 per day without board. Less corn will be planted than usual, on account of scarcity and high price of help.

Whately (Frank Dickinson). — The season is late and cold. Pastures and mowings are backward, but promise well. Apples are a full bloom; some pear bloom; other fruits light. Very few insects as yet. Planting has just begun. Farm help is scarce, and not more than one-fourth of it good. Wages average from $20 to $27 per month with board and from $35 to $40 without board. Rather more corn for silage will be put in than usual.

Montague (A. M. Lyman). — The season is two weeks late, and not likely to catch up soon. Pastures and mowings are in fair condition; fall seeding wintered well; clover much killed. Not over 25 per cent of a full fruit bloom, hard frost of the 22d causing further injury. Not much damage from insects as yet; tent caterpillars have appeared. Potatoes have been planted, but planting is progressing very slowly. Wages average $25 per month with board and $40 per month without board. There will be about the usual acreage of farm crops.

Erving (Chas. F. Clark). — The season is more backward than usual. The prospect is good for pastures and mowings, but fall seeding did not winter well. There is an average fruit bloom, with no damage from frosts. There is no damage from insects at present. Planting is progressing slowly. Farm help is scarce, and half of it good help. Wages average $20 per month with board and $1.50 per day without board.

New Salem (Daniel Ballard). — The season is very backward. Pastures and mowings are looking fairly well, and fall seeding wintered well. Pear and peach bloom very light; full bloom of apples; all suffered somewhat from frosts. Tent caterpillars are very plenty. Planting is progressing very slowly. Farm help is not plenty, but is mostly good help. Wages range from $18 to $26 per month with board and from $1.50 to $2 per day without board. There will be the usual acreage of farm crops.

HAMPSHIRE COUNTY.

Ware (J. H. Fletcher). — The season is late, as compared with other years. Pastures and well-cared-for mowings are looking well. The apple bloom will be large, but hard frosts may have done damage

on low lands. No insects have appeared as yet. Planting is very late. Farm help is not plenty, and good help is hard to find. Wages range from $20 to $25 per month with board and average $1.50 per day without board. There will be no changes in the acreage of the usual crops.

Greenwich (Walter H. Glazier). — The season is about a normal one. Pastures and mowings promise excellently; fall seeding wintered well. Apple trees will have a fair bloom; no injury from frost. No insects have done any damage as yet. But little planting has been done. It is almost impossible to get help, even by the day. Wages average $1.50 per day without board. Stock is looking well. There will be little change in the acreage of farm crops.

Pelham (John L. Brewer). — The season is cold and very late. There is a fair prospect for pastures and mowings; fall seeding wintered finely. A light bloom of apples and pears; no peach bloom; plums promise well. There are a few tent caterpillars, but insects have done little damage. Planting is ahead of the average for time of year. Farm help is scarce, almost all being at work lumbering; help good enough when sober. Wages average from $1.50 to $1.75 per day without board. More potatoes have been planted than usual.

Amherst (Prof. Wm. P. Brooks). — The season has been cold, and vegetation is from seven to ten days late. Pastures and mowings look unusually well; fall seeding wintered perfectly. Apple bloom heavy; pears little grown; no bloom on peaches or Japanese plums; other plums heavy bloom; small fruits promise well. No insects have appeared as yet. Planting is progressing well, as weather has been favorable for work. Farm help is scarce, and but little of it satisfactory. Wages range from $15 to $30 per month with board; board usually reckoned at from $14 to $18 per month. No particular changes in the acreage of farm crops.

Hadley (H. C. Russell). — The season is ten days late. New seed looks well; pastures and mowings good. Bloom of small fruits good, and apples especially good. No insects have appeared. Planting is late, owing to cold weather. Farm help is scarce, and wages higher than ever. Wages average $25 per month with board and $1.50 per day without board. There is a decrease in the acreage of onions and a slight increase in that of tobacco; other crops about as usual.

Hatfield (Thaddeus Graves). — The season is two weeks later than usual. The promise of pastures and mowings is good, and fall seeding wintered well. Full bloom of apples; none of peaches; others backward. Planting is two weeks behind the average. Farm help is scarce, and perhaps one-third of it is good help. Wages average $25 per month with board and $38 per month without board. There will be no marked changes in the acreage of the usual farm crops.

Williamsburg (F. C. Richards). — The season has been cold and backward, and is ten days later than normal. Fall seeding wintered

well; mowings look well; pastures just getting well started. Apples show a very heavy bloom; pears from one-half to two-thirds of the normal; no peaches. No planting has been done, except of potatoes. Farm help is more scarce than ever, and also poorer than ever. Wages range from $20 to $25 per month with board and average $35 per month without board. There are no particular changes in the acreage of farm crops. Plums, cherries and strawberries were perhaps damaged by frosts on the 20th and 21st.

Cummington (S. W. Clark). — The season is from eight to ten days late. Pastures and mowings promise well; fall seeding winter-killed somewhat. Apple bloom not out yet; other fruits blossomed well. No insects are active as yet. Planting is progressing slowly; ground cold and help scarce. Farm help is very scarce indeed. Nearly all our farmers are getting along without hiring; wages from $1.50 to $1.75 per day without board. Probably the acreage of farm crops will be less than usual.

HAMPDEN COUNTY.

Blandford (Enos W. Boise). — The season is fully three weeks late. Pastures are short, but mowings look fairly well. Apples not yet in bloom, but promise average bloom; pears and plums full bloom; wild berries fair bloom. A few tent caterpillars are coming out. Very little planting has been done. Farm help is scarce, and not over one in ten perfectly reliable. Wages average $25 per month and $1.25 per day with board and $40 per month and $1.75 per day without board. A smaller acreage of field crops than usual will be planted, owing to cold weather and a scarcity of help.

Russell (E. D. Parks). — The season is very backward. Pastures and mowings promise well; fall seeding wintered well. The fruit bloom is fully up to the average, except for peaches; no frost since apple trees came in bloom. Tent caterpillars have appeared. Planting is backward, but is being rushed at present. Farm help is very scarce, and there is but little good help obtainable. Wages average $25 per month with board and range from $40 to $45 per month without board. There are no marked changes in the acreage of farm crops.

West Springfield (T. A. Rogers). — The season is about two weeks late. Pastures are a little short, and growth slow; mowings looking well, but late; fall seeding looking well. Apples a full average; peaches all killed; pears and plums half bloom. No insects are doing damage as yet. Potato planting about done, and corn now being planted. Help is very scarce, and most of it very ordinary or poor. Wages average $25 per month with board and $1.50 to $1.75 per day without board.

Agawam (John G. Burt). — The season is two weeks later than usual. Pastures and mowings are in good condition, and fall seeding

wintered well. Fruit bloom was full, but has probably suffered from frosts. Tent caterpillars are the only insects present as yet. Not much planting has been done, because of cold weather. Help is scarce, and not more than half of it good help. Wages average $25 per month with board and $35 to $40 per month without board. There will be no change in the acreage of the usual farm crops.

Chicopee (E. L. Shaw). — The season is very backward for everything but hay and grain. Pastures and mowings are doing well and fall seeding wintered well. Apple bloom full; pears fair; peaches none, and trees badly winter-killed; small fruits badly winter-killed. Elm tree beetles, the San José scale and white scale are all doing damage. Planting is progressing slowly, on account of cold weather. Farm help is very scarce, and one-half might be called good help. Wages average $25 per month with board and $1.50 per day without board. Less potatoes than usual have been planted, and more corn; acreage of grass increased.

East Longmeadow (John L. Davis). — The season is about four weeks late. Pastures and mowings look well; fall seeding wintered well. There is a good bloom of apples, pears and plums; no peaches. It is too early for damage by insects. Planting is now in full swing. Farm help is very scarce, and of poor quality. Wages range from $20 to $25 per month with board and from $1.50 to $1.75 per day of nine hours without board. There will probably be a smaller acreage of farm crops than usual, owing to shortage of help.

Monson (F. D. Rogers). — Season very good, though late. Mowings and pastures look well, but are later than usual. Apples and plums bloomed full; no peaches; pears three-fourths bloom; raspberries winter-killed badly. No insects are doing damage to any extent. Planting is very late. Most farmers have help by the month, but day help is scarce. Wages average $20 per month with board and $30 per month without board, but with tenement and fuel. There are no marked changes in the acreage of farm crops.

Holland (Francis Wight). — The season is cold and backward. Pastures and mowings are looking fairly well. It is too early to report certainly in regard to fruit bloom. No insects have appeared as yet. Planting is progressing slowly. Farm help is scarce. Wages average $1 per day with board and $1.50 per day without board. There will be no marked changes in the acreage of farm crops.

WORCESTER COUNTY.

Dudley (J. J. Gilles). — The season is late. Pastures and mowings promise well, and fall seeding wintered well. Off year for apples, and bloom light; pears normal; peaches a failure; plums fair; frosts have undoubtedly done some injury. No insects have been destructive as yet. Planting is progressing fairly well. There is an unusual scarcity

of farm help. Wages range from $20 to $25 per month with board and from $35 to $40 without board. There are no particular changes in the acreage of farm crops.

Warren (W. E. Patrick). — The season is very backward, probably two weeks. Pastures and mowings promise well; fall seeding wintered well. Small bloom on apples; none on peaches; pears full; other small fruits fairly good. Weather too cold for insects. Planting is progressing very slowly, as the ground is still too cold. Help is not simply scarce, there is none to be had. Wages average $26 per month with board. Much less acreage than usual in corn and potatoes, on account of the scarcity of help.

North Brookfield (John H. Lane). — The season is late and very cold. Pastures and mowings promise well, and fall seeding wintered well. The fruit bloom has not yet appeared. Insects are also still quiescent. The season is so late that planting is progressing very slowly; farmers seem to lack courage to put in hoed crops. Farm help is very scarce, and not over one-tenth of it good help. Wages average $25 per month with board and $1.75 per day without board.

Dana (Lyman Randall). — The season is very cold and backward; fully two weeks later than usual. Pastures and mowings are looking well, and fall seeding wintered well. Apples have blossomed fairly full, and other fruits have not; no injury from frosts as yet. Insects have not appeared. Planting is two weeks behind the usual schedule. Farm help is very scarce, and not over half of it can be called good. Wages range from $25 to $30 per month with board and from $40 to $45 per month without board. More small fruits have been put in than usual.

Hubbardston (Chas. C. Colby). — The season is nearly or quite fifteen days late. Pastures and mowings are looking well, and there promises to be a large hay crop. At this writing very few fruit trees are in bloom. Insects have not appeared. Very little planting has been done at this time. Farm help is scarce, with only a small portion of it good help. Wages range from $20 to $26 per month with board and from $1.50 to $2 per day without board. About the usual amount of staple crops will be planted this season.

Royalston (C. A. Stimson). — The season is cold and backward. Pastures and mowings are in good condition; fall seeding fairly good. No fruit bloom as yet, except on plums. No insects doing damage. Very little planting has been done. All help scarce, and one-tenth of it good. Wages average $35 per month with board and $1.75 per day without board. There are no marked changes in the acreage of farm crops.

Fitchburg (Dr. Jabez Fisher). — Judged by the pear bloom, the season is four days later than the average of fifty-one years. Pastures and mowings look well. Apples and pears promise a smaller bloom than last year; plums full bloom; no peaches. Insects make no show as yet. Planting is progressing slowly. Good help is not plenty.

Wages average $20 per month with board and $1.50 per day without board. There is nothing especially new in agriculture.

Sterling (Henry S. Sawyer). — The season is very backward in every respect. Pastures and mowings are looking fairly well, and fall seeding wintered fairly well. Peaches suffered from frost, also small fruits; good bloom of apples, pears and plums. No insects are doing damage. Planting is progressing very slowly, very few having any corn planted. Farm help is very scarce, and hardly one-third can be called good help. Wages average $20 per month with board and $1.50 per day without board. There will be about the usual acreage of farm crops.

Northborough (John K. Mills). — The season is two weeks late. Grass is coming along nicely in pastures and mowings; fall seeding wintered well. There appears to be a good bloom of all kinds of fruit. There is but little damage being done by insects. Planting is progressing slowly, the ground being too cold for planting of most crops. There is but little good farm help. Wages range from $20 to $35 per month and from $1.75 to $2 per day. The acreage of corn and potatoes will be as large as last year, if we have warm weather soon.

Auburn (Wm. Gilbert). — The weather is very cold, and the season fully two weeks late. Pastures and mowings look well; fall seeding wintered well. Fruit trees promise a good bloom. Cut worms are doing some damage. Planting is progressing very slowly, owing to cold weather. Farm help is very scarce, and only about one-half of it can be called good help. Wages average $25 per month with board and about $2 per day without board. There will be no marked changes in the acreage of farm crops.

Oxford (D. M. Howe). — The season is two weeks late. Pastures and mowings promise well, and fall seeding wintered well. The fruit bloom is not out at time of reporting. Insects are not doing any damage as yet. Planting is progressing very slowly. Farm help is scarce, and little of it good. Wages average $25 per month with board and $35 without. The acreage of corn and potatoes will be somewhat increased. Many of our best farmers are going into poultry to a greater or less extent.

Blackstone (O. F. Fuller). — The season is backward. Mowings promise a good crop of hay, and fall seeding looks well. There will probably not be more than a half crop of fruit this year. The San José scale is doing much damage in this section. Planting is progressing very slowly. Wages range from $15 to $20 per month with board and $1.50 per day without board. There will be no marked changes in the acreage of farm crops.

MIDDLESEX COUNTY.

Hopkinton (W. V. Thompson). — The season is at least two weeks late. Pastures and mowings are in good condition, and fall seeding wintered well. No peach bloom; plums light; pears full; apples full

for odd year. White grubs are doing some damage to grass lands. But little planting has been done; we are just getting ready. Not much help is hired here. The acreage of all crops remains about the same as usual.

Marlborough (E. D. Howe). — The season is fully a week late. Pastures and mowings are green, but backward. Apples show half a bloom; pears three-fourths; peaches none; plums full and small fruits nearly so. No damage from frost. Currant worms are working; also brown-tail moths. Not more than 10 per cent of the planting has been done. Wages average $26 per month with board and $10.50 per week without board. There are no changes in the acreage of farm crops.

Stow (G. W. Bradley). — The season is later than usual. The prospect is good for a good hay crop; fall seeding wintered finely. Apples and pears are just coming into bloom, and look well for the odd year; no damage from frost. Tent caterpillars have appeared, but the cold weather is keeping them back. Planting is progressing very slowly. Farm help is very scarce and poor. Wages range from $15 to $30 per month with board and from $1.50 to $2 per day without board. There will not be much change in the acreage of farm crops.

Townsend (Geo. A. Wilder). — The season is late. Pastures and mowings look fairly well, and fall seeding wintered well. There was a heavy fruit bloom, but there has been a loss of 75 per cent of it from frost. A few brown-tail moths have appeared. Planting is very late. Farm help is scarce, and not over half of it good help. Wages average $20 per month with board and range from $1.50 to $2 per day without board. There are no special changes in the acreage of field crops.

Dunstable (A. J. Gilson). — The season is fully two weeks later than the normal. Pastures and mowings are backward; fall seeding wintered well. Light bloom of Baldwin apples, other varieties fuller; pears a full bloom; peaches none; plums and small fruits about the same as usual; damage from frost uncertain. No trouble from insects at present. Planting is progressing slowly, little having been done. Farm help is very scarce, and not as good as it should be. Wages average $1.25 per day with board and $1.50 without board. There will probably be a smaller acreage of hoed crops than usual.

Tewksbury (G. E. Crosby). — The season is very backward. Pastures and mowings are coming on slowly. Very light bloom of peaches, plums and apples, but good for an off year. No special damage is being done by insects. Planting is progressing slowly, owing to fear of frosts. Farm help is scarce, and perhaps one-fourth is good help. Wages average from $20 to $25 per month with board and from $1.50 to $2 per day without board. There will be about the usual acreage of farm crops.

Carlisle (Alvah Carr). — This is the most backward season for years. Pastures are looking well; also mowings and fall seeding. The fruit bloom is light, especially for peaches and plums. The gypsy

moth is proving very troublesome. The season is very backward. Farm help is very scarce, and about one in five good help. Wages range from $25 to $30 per month with board and average $1.75 per day without board. On account of scarcity of help, there will be a decreased acreage of hoed crops.

Concord (Wm. H. Hunt). — The season is over a week late. Pastures, mowings and fall seeding look well. Fruit trees have blossomed full, and have not suffered from frost. It is rather early for damage from insects. Planting is rather backward. Farm help is scarce, and only a small proportion of it good. Wages average $25 per month with board and $46 without. The acreage of crops grown will be much the same as usual.

Stoneham (J. E. Wiley). — The present season is very backward. Pastures and mowings promise well, with rain; fall seeding wintered well. Apples and pears show a good bloom, with no injury from frosts. No insects have appeared as yet, but gypsy moth nests are very plenty in the south part of the town. Planting is progressing very slowly. Farm help is very scarce, and only a small part of it can be called good help. Wages average $13 per month with board and $30 without board.

Newton (G. L. Marcy). — The season is backward and cold. Pastures and mowings promise well, and fall seeding wintered well. There is about the usual fruit bloom, and it has not suffered from frosts. No insects are doing damage as yet. Planting is backward. There is no help to be had. Wages range from $25 to $35 per month with board and from $11 to $13 per week without board. There will be no special changes in the acreage of farm crops.

ESSEX COUNTY.

Amesbury (F. W. Sargent). — The season is three weeks or more late. Pastures and mowings promise well. It is too early to answer as to fruit bloom. No insects are doing damage at present. Planting is progressing fairly well, though the ground is cold. Farmers are getting some help from Boston agencies, but are not very well satisfied. Wages average $25 monthly with board. There will be little change in the acreage of farm crops; a few are experimenting with alfalfa.

Groveland (A. S. Longfellow). — The season is two weeks later than usual. Fall seeding is looking well, and pastures are starting well, but are late. There is a good bloom of pears; apples and peaches light; no damage from frost. Some tent caterpillars and brown-tail moths have appeared. Planting is well under way. Help is more scarce than usual, and there is little good help. Wages range from $20 to $25 per month with board and average $1.50 per day without board. There are no marked changes in the acreage of farm crops.

North Andover (Peter Holt). — This is a very late season, cold

and backward. All grass is looking well; fall seeding wintered well. The apple bloom is just beginning to show, very light on winter apples; pears bloomed well; no peaches; plums full; small fruits somewhat winter-killed. The cold weather has kept all insects from doing much harm. Planting is progressing very slowly. Farm help is scarce, and less than 10 per cent of it is good help. Wages average from $20 to $25 per month with board and from $1.50 to $1.75 per day without board. There are no marked changes in the acreage of farm crops.

Rowley (D. H. O'Brien). — The season is cold and backward. Pastures and mowings look fairly well; fall seeding wintered well. The fruit bloom is below average, and has suffered from frosts. The weather has been too cold for insects to be troublesome. Planting is progressing slowly. Help is scarce, and not over one-quarter of it good help. Wages average $22 per month with board and $1.50 per day without board. There are no marked changes in the acreage of farm crops.

Wenham (N. Porter Perkins). — We call the season quite backward; seed of all kinds quite slow in germination. As a rule, grass is quite forward, but there is not much feed in pastures. There is a fair bloom on apples, but not many trees in full bloom; not much damage from frost. Planting is not more than half done. Farm help is scarce, and but a small part of it good help. Wages average $16 to $27 per month with board and from $1.50 to $2 per day without board.

Danvers (Chas. H. Preston). — The season is very backward. Grass in pastures is light; mowings look well; fall seeding wintered well. The bloom of apples and pears is good; plums fair. An average amount of planting has been done. Farm help is scarce. Wages average $25 per month with board and $42 without board. There will be no marked changes in the acreage of farm crops.

NORFOLK COUNTY.

Norwood (Frank A. Fales). — The season is three weeks late. Pastures and mowings are looking well, and fall seeding wintered about as usual. The bloom of apples and pears about 50 per cent of average; plums and small fruit very late; very little damage from frosts. Very little planting has been done as yet. Farm help is very scarce, and not more than 60 per cent of it can be called good help. Wages range from $24 to $30 per month with board and average $1.75 per day without board. The acreage of potatoes will be decreased 30 per cent. A large number of pear trees have died from what is said to be the San José scale.

Walpole (Edward L. Shepard). — The season is below the normal, being cold and backward. Pastures and mowings look well, and fall seeding wintered well. Apples and pears half a bloom; no peaches; plums light; strawberries and blueberries full; no frost as yet. Tent caterpillars and a few brown-tail and gypsy moth caterpillars have

appeared. Planting is progressing rather slowly. Farm help is scarce, and rather poor. Wages average $2 per day without board. There will be a smaller acreage of corn than usual.

Norfolk (A. D. Towne). — The season is about three weeks late. Pastures and mowings are above average, and fall seeding looks fairly well. No peaches; plums and pears light; apples average for off year; frost on 20th injured small fruits and strawberries. Tent caterpillars are doing some damage. Planting is about half done. Farm help is rather scarce. Wages range from $20 to $25 per month with board and from $1.50 to $1.75 per day without board. There will be no marked changes in the acreage of farm crops.

Millis (E. F. Richardson). — The season is cold, wet and late. Pastures and mowings are in excellent condition, and fall seeding looks finely. There is a light bloom of fruits, which is not all out. No insects have appeared as yet. Planting is progressing slowly. Farm help is exceedingly scarce. Wages range from $25 to $35 per month with board and from $40 to $50 per month without board. There are no marked changes in the acreage of farm crops.

BRISTOL COUNTY.

Mansfield (Wm. C. Winter). — The season is about two weeks late. Pastures and mowings look fairly well; little fall seeding done. Apples and pears promise a fair crop; no peaches; plums poor; many trees of both peaches and plums winter-killed. Currant worms have appeared. Very little planting done so far, except early vegetables. Help is scarce, and unusually poor. Wages average $1.75 per day without board. There will be a decreased acreage of corn and potatoes, owing to the late season and higher prices for help.

Seekonk (John W. Peck). — The season is ten days later than usual. Pastures and mowings are in excellent condition; fall seeding wintered well. Fruit trees are blossoming fairly well; no frosts to do damage. Have heard of no insects doing damage. Planting is progressing slowly, owing to cold and rainy weather. Farm help is scarce, not over two-thirds of it being good help. Wages average $28 per month with board and $40 without. The acreage of corn will probably be decreased, owing to the lateness of the season.

Dighton (James N. Paul). — The season is very late. Pastures and mowing promise well, and fall seeding wintered well. Apples and pears have bloomed well; no peach or plum bloom; strawberries promise well; raspberries and blackberries winter-killed. Insects do not appear to be doing much damage. Planting has progressed about as usual. There appears to be plenty of farm help, most of it good help. Wages range from $16 to $25 per month with board and from $1.25 to $1.75 per day without board. There is no marked change in acreage of farm crops.

Berkley (Rollin H. Babbitt). — Every farm crop, except grass,

is suffering from the prolonged cold weather. Pastures and mowings look finely; fall seeding wintered fairly well. The cold weather of February destroyed the peach crop, and damaged other fruit trees to some extent. There is but little damage from insects. Planting is progressing very rapidly, every one hustling to make up lost time. Farm help is very scarce; wages high, and much of the help poor. Wages range from $20 to $25 per month with board and average $1.50 per day without. There will be an increase in acreage of corn, on account of high prices of grain.

Dartmouth (L. T. Davis). — The season is very much behind. Pastures are backward, but mowings look well; fall seeding wintered fairly well. Apples promise a full bloom; other fruits uncertain. No insects are at work as yet. Not much planting has been done except potatoes. Help is no scarcer than usual. Wages range from $20 to $35 per month and from $1.50 to $2 per day. There will be no marked changes in the acreage of farm crops.

Acushnet (M. S. Douglas). — The season is very backward and cold. Meadows are in fine condition. No peach bloom; apples and cherries good; pears small bloom. No insects have appeared. Planting is very backward, as the weather is very cold. Farm help is very scarce, and there is no good help. Wages range from $20 to $24 per month with board and average $1.50 per day without board. There will be a smaller acreage of farm crops than usual, on account of poor help.

PLYMOUTH COUNTY.

Brockton (Davis Copeland). — The season is about two weeks late. Pastures and mowings are in good condition, and fall seeding wintered well. Fruit trees of all kinds will bloom well. There is little damage by insects. Planting is progressing very slowly. Farm help is very scarce.

Marshfield (John H. Bourne). — The season is exceedingly backward. Pastures and mowings are in very good condition; fall seeding is well started. Pears and peaches just in bloom; pears full; peaches scattering; no apple bloom as yet, and on some trees but few buds. Planting is progressing slowly. Farm help is scarce, with much of it poor. Wages average $25 per month with board and $1.75 per day without board. There is not much change in the acreage of farm crops.

Hanson (Flavel S. Thomas, M.D.). — The season is very cold, wet and backward. Pastures and mowings promise well, and fall seeding wintered well. There is a good fruit bloom, and no damage from frosts. No insects are doing damage. Planting is progressing slowly, on account of cold and rain. Farm help is fairly plenty, and good. There is no particular change in the acreage of farm crops.

Duxbury (Robert Randall). — The weather is cold, and the season backward for planting. Mowings are in very poor condition; not

much fall seeding done. Plums blossomed well, but apples and other fruits are very poor; strawberries injured by frost. Not many insects are doing damage. It is so cold that planting is progressing slowly. Farm help is scarce, and not half of it good help. Wages range from $1.50 to $2 for a day of eight hours. The acreage of farm crops will be about the same as usual.

Plympton (Winthrop Fillebrown). — The season is cold and backward. Pastures and mowings look in excellent condition; fall seeding wintered well. The fruit bloom is backward, but will be good if not injured by frosts. No insects have appeared. Planting is progressing very slowly, on account of cold and wet weather. Farm help is scarce, and very little of it good help. Wages range from $20 to $30 per month with board and from $1.75 to $2 per day without board. There will perhaps be an increase in the acreage of corn.

Lakeville (N. G. Staples). — The season is backward. Pastures and mowings look well; fall seeding wintered well. Apples are just in bloom, with a fair set. No insects are doing damage at present. Planting is from one to three weeks behind. Farm help is scarce, and about half of it good help. Wages average $20 per month with board and $1.75 per day without board. There will be no special change in the acreage of farm crops.

Wareham (A. B. Savary). — The season is very cold and backward, about three weeks late. Pastures and mowings promise well, but are backward; fall seeding wintered well. Fruit trees are not in bloom to any extent, but promise a good bloom. No insects as yet. Planting is not progressing very rapidly. Farm help is scarce, and there is no first-class help. Wages range from $20 to $30 per month with board and from $1.50 to $2 per day without board. There are no marked changes in the acreage of farm crops.

BARNSTABLE COUNTY.

Falmouth (Daniel R. Wicks). — The season is fully two weeks later than the normal. Pastures and mowings are fine; late, but well stooled for a big crop of hay. Peaches and plums are a full bloom; currants and gooseberries promise big yields. Tent caterpillars are just hatching out, and currant worms have appeared. Planting is away behind the normal. Very little or no native help; plenty of Portuguese, but they are poor help. Wages average $1.50 per day of nine hours with board and $2 per day without board. The acreage of corn will perhaps be slightly increased.

Sandwich (R. F. Armstrong). — The season is cold and backward. Pastures and mowings are looking well; no fall seeding. The bloom of all fruit trees is heaver than last year. A few tent caterpillars have hatched, and the June beetle seems to be plenty. Planting is progressing slowly. Farm help is scarce, and a very small proportion of it good

help. Wages average $1 per day with board and $1.50 per day without board. There are no changes in the acreage of farm crops.

Barnstable (John Bursley). — The season is a few days late, and very cold at time of writing. Pastures and mowings are looking well; seeding that started well last fall is looking well. All fruit bloom appears to be full; no damage from frosts. The cold weather has prevented damage from insects. Planting is progressing very slowly upon heavy ground. Farm help is very scarce indeed, and one-third of it good help. Wages average $25 per month with board and 20 cents per hour without board.

Harwich (Ambrose N. Doane). — The season is very backward. Pastures and mowings do not promise very well. Fruit trees are not looking well; no damage from frosts. No insects are doing damage. Planting is progressing favorably. Farm help is very scarce, and not much of it good help. Wages average $25 per month with board and $40 without. There is an increased acreage of potatoes this year.

Eastham (J. A. Clark). — The season is very late, at least ten days. Pastures and mowings are in good condition. There is a light bloom of fruits, and they have not suffered from frosts. No insects are doing special damage. Planting progresses fairly well. Farm help is scarce, but is mostly fairly good. Wages range from $25 to $30 per month with board and average $45 per month without board. Quite a large crop of asparagus has been set this spring; season is on, with fairly good prices.

Truro (John B. Dyer). — The season is about two weeks behind. Grass looks well, only late; fall seeding fair. Little early to predict as to fruit bloom; no damage from frosts as yet. No insects have appeared as yet. Planting is progressing more slowly than usual. Farm help is confined largely to big boys, from sixteen to twenty years of age. Wages average from $15 to $20 per month with board and from 15 to 20 cents per hour without board. One new cranberry bog is being made, from 30 to 40 acres.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — The season is very backward, on account of cold weather. Pastures and mowings promise well. The fruit bloom is very backward on all kinds. No insects have appeared as yet. Planting is progressing slowly. Farm help is scarce, and about one-fourth of it good help. Wages average $20 per month with board and range from $1.50 to $2 per day without board. There are no marked changes in the acreage of the usual farm crops.

BULLETIN OF

MASSACHUSETTS BOARD OF AGRICULTURE.

CORN AS A GRAIN CROP IN MASSACHUSETTS.

By PROF. WM. P. BROOKS, *Director, Massachusetts Agricultural Experiment Station.*

It is the purpose of this article to consider this crop almost exclusively from the standpoint of grain production, though occasional reference to suitability for ensilage has been made.

Indian corn is in many respects the most important crop of the United States. It is produced here in much greater quantity than in all the rest of the world put together. Several times within recent years the total crop has exceeded two and one-half billion bushels. This is at the rate of about 35 bushels for each man, woman and child in the country. The crop finds many uses; but by far the larger portion is employed as stock food, and the manufacture of starch, glucose, whiskey and alcohol consumes in the aggregate enormous quantities. There is not a State or a Territory in the Union in which corn is not grown, but its cultivation is largely concentrated in the great States of the Mississippi valley. Corn, however, always has been and is now an important crop in Massachusetts. The average product per acre in the United States as a whole during the five years 1901 to 1905 inclusive was about 25 bushels. In Massachusetts the average product during the same period was about 34 bushels; and, while Massachusetts is not generally looked upon as a great corn State, it is significant that it is exceeded in average product by but very few States, and in the value of product per acre by only one, — Connecticut. These facts do not, of course, prove that corn growing is more profitable in Massachusetts than in other States, for the costs of production may be and probably are greater than in the States of the middle west. There can be no doubt, however, that corn can be produced at a profit in Massachusetts, for the average price per bushel is far higher than in most parts of the country. In 1905 the average farm prices of corn were as follows: in the United States as a whole, $0.288; in Iowa, $0.34; in Illinois, $0.38; in Indiana, $0.38; in Massachusetts, $0.70. We must, of course, use fertilizers more largely in Massachusetts than in the States named; but even in these States the soils are gradually becoming less fertile, and the use of fertilizers, in small amounts at least, is becoming general. On many soils in Massachusetts an average expenditure of about $20 per acre for fertilizers will insure an annual product at the rate of from 60 to 70 bushels. This is at the rate of only about $0.30 per bushel for corn produced, but in Massachusetts the stover is worth much more as forage than in the States which have just been named. On many Massachusetts farms the

value of the stover will equal the total expenditure for fertilizers, so that the corn produced costs the farmer only the amount expended for labor in the production of the crop. The labor cost in this State is often unnecessarily high. It must perhaps always average somewhat higher than in the great States of the Mississippi valley, for our farms are rougher and our corn fields average smaller. The price of farm lands, however, in this State is so low that obstructions to the use of more progressive methods may be removed, and the total expenditure, including first cost and improvements, will still be lower than the price of good farm land in many of the great States in the corn belt. These improvements being made, the labor cost of producing corn in Massachusetts need not be materially, if at all, greater than in the great corn States. If, then, as can scarcely be doubted, the stover is worth enough in this State to cover the cost of the needed fertilizers, and the labor cost can be kept practically as low as in the great corn States, there would seem to be no reason why Massachusetts should not produce a much larger proportion of the corn used within her borders. It is certain, at least, that our farmers buy too much corn.

Special Reasons why Corn is a Desirable Crop.

The fact that our soils and climate are admirably suited for the production of corn is among the reasons why the American farmer can produce food at prices which defy competition.

Among the various plants which are cultivated by man, the corn plant is in many respects one of the most wonderful. In a very real sense it is a child of the sun. There are indeed varieties which may be cultivated well to the north, but only in localities where the summer, though short, is fervid. The sun is a source of power, and the plant which thrives best under the intense heat of the sun is the plant which, other things being equal, can store up in its tissues or in its seeds the maximum of energy poured out upon its leaves by the sun. Among the different crops which we can cultivate, none equals corn in its capacity for storing up this heat energy. The chemist in comparing different foods is accustomed to speak of their ultimate food value on the basis of the total amount of heat produced when the food is assimilated and fully oxidized in the body, or burned in apparatus especially designed for the purpose. His unit of measurement is the calorie.[1] On the basis of total heat energy produced, the products per acre of some of the leading crops have the following relative valuations:[2]—

	Calories.
One acre of corn,	10,020,800
One acre of mangels,	6,801,760
One acre of Swedes,	6,268,860
One acre of potatoes,	6,024,600
One acre of oats,	3,578,660
One acre of rye,	3,731,000

On the basis of cost per acre, on the college farm, 10,000 calories of heat energy cost as follows: with corn as the crop, $0.033; with mangels, $0.112; with Swedes, $0.051; with potatoes, $0.083. Oats

[1] A calorie is the quantity of heat necessary to raise the temperature of a kilogram of water one degree Centigrade.

[2] These figures for corn, mangels, Swedes and potatoes are from a paper on "Field Crops" in "Agriculture of Massachusetts" for 1895, and are based upon crops upon the college farm. The figures for oats and rye are calculated on the basis of the average yields of these crops in Massachusetts. The figure for corn includes the entire plant in the form of silage; those for oats and rye include straw as well as grain, assumed to amount to a ton and a half per acre in each case.

and rye are not cultivated on the college farm, and it is impossible to extend the comparison to these crops. It will be noticed that corn far surpasses either of the other crops in the total number of calories produced per acre, while the cost of 10,000 calories is far lower than with either of the other crops.

But, besides excelling other crops in its capacity to store up power received from the sun in the shape of light and heat, and in the cost of a given amount of food, corn surpasses most other crops in other important particulars. It is remarkably free from disease. Seldom is any considerable proportion of the crop destroyed either by disease or by insect enemies, and, while it is considerably affected by season, it is without doubt one of the most certain among the various crops we can cultivate. From every point of view, therefore, it would seem that corn is a crop deserving of greater attention than it receives on the part of Massachusetts farmers.

Botanical Characteristics.

Indian corn (*Zea mays*) is a native of the American continent, and is believed to have descended from a wild form characterized by the production of numerous very small ears on each of several joints. A form discovered within comparatively recent times, to which the name *Zea canina* was given, is believed by many to be the parent type. It has sometimes been asserted that pod corn, the variety in which each individual kernel is enclosed in a separate husk, is the parent form of our cultivated varieties; but this theory is not now generally accepted. Corn belongs to the great grass family, — the family which includes all the important cereal grains, as well as the field and pasture grasses, sugar cane, sorghum and broom corn. It differs from most grasses in having a solid, pithy stem, which, by the way, is one of the principal reasons why this crop is so much better fitted for preservation in the silo than other grasses.

The flowers of the grass plant are imperfect, male and female being borne on different parts of the same plant, the former in the tassels, the latter in that portion of the plant produced at one or more joints which develops into the ear. If just before the corn plant comes into tassel the stem be cut above either of the joints between about the third and sixth, an embryo ear will be found. The ovules, arranged in regular rows as the kernels will be later, can be distinctly recognized. Connecting with the top of each of these is one of the fibers which make up the silk which is later pushed up into the air. One of these ovules with its connecting fiber of silk is a single female flower; and, in order that the ovule may develop into a grain of corn, it is essential that at least one grain of pollen shall fall upon the fiber of silk connected with it and germinate there. To fit the silk the better for catching and holding the pollen grains, the tips are somewhat feathery. The yellow dust which falls so abundantly from the tassel is the pollen, and this is freely carried by currents of air and the wind often to considerable distances. As is well understood, cross-fertilization in nature usually gives better results than self-fertilization, and so nature has so contrived the corn plant that the pollen on any individual is matured and shed before its pistils are receptive. It must therefore be seen that the silk of any particular plant is pollinated from other plants; and it is because of this peculiarity of the corn plant, and because the pollen, made up of grains so minute and light, is carried long distances by the wind, that different varieties of corn are likely to mix more or less, although comparatively widely separated. The

distance which will be necessary to insure freedom from mixture will vary with the intervening country and with the direction of the prevailing winds during the time when the corn plant is in flower; but to insure even comparative freedom from crossing, a separation of a number of hundred yards at least is essential. The statement has been made that an embryonic ear of corn may be found above each of several of the joints of the corn plant. The question will naturally arise, Why do not each of these develop into a perfect ear? Dr. E. Louis Sturtevant, as a result of observations and experiments, believed that, by root pruning just before the period when the corn plant comes into flower, he could cause the development of most of these embryo ears; and he certainly obtained some remarkable results by heavy root pruning from plants standing in excessively rich soil. Nothing of any great practical importance, however, has followed as a result of Sturtevant's work in this particular direction; and, indeed, it may be doubted whether in the case of our field corns at least it is desirable that each plant shall as a rule bear more than one ear. If the weight of the grain of a single good ear of corn is taken, and this be multiplied by the number of corn plants ordinarily standing in a well-stocked field, it will be found that a single good ear to a plant will give an enormous yield, varying according to the size of the ears from 125 to 200 or more bushels of shelled grain. Such a yield as this is probably as great as it is wise, with our present knowledge at least, to aim for; and if it can be obtained by the cultivation of such a variety of corn or by cultivation in such a manner as to insure the production of an average of one good ear to each plant, the results must be eminently satisfactory, — more so than if an equal yield be obtained through the cultivation of a variety producing plural but smaller ears.

Agricultural Classification and Varieties.

The recognized varieties of Indian corn are as follows: *Z. indurata*, flint varieties; *Z. everta*, pop corns; *Z. indentata*, dent varieties; *Z. saccharata*, sweet varieties; *Z. amylacea*, soft or flour corns; *Z. amylacea-saccharata*, soft or starch sweet corns; *Z. tunicata*, pod corns.

For the purposes of this article we need consider only the flint, dent and sweet varieties. To the flint varieties belong practically all of the old New England varieties of field corn. Most of them are comparatively early, although there is a wide variation. The plants are short as compared with the dent varieties, and have a much greater inclination to produce suckers. Flint varieties of corn are somewhat less fastidious as to soil and climatic conditions than dent varieties; and, although there are now several dent varieties under successful cultivation in New England, it seems to be true that the soils and climate of this section are on the whole better suited to flint varieties than to dent. This seems to be indicated from the fact that dent varieties of corn continuously cultivated in New England gradually lose some of the characteristics of the dent class, and become more and more like the flint type. The idea is quite generally held that corn of our old New England flint varieties has a higher nutritive value than corn of the dent varieties; but neither the investigations of the chemist nor those of the practical feeder lend confirmation to this view. It is doubtless true that home-made meal from flint varieties averages better than meal from dent varieties, but this is principally because our home-grown corns are better ripened and better cured than western grown. If grain is to be fed without grinding, corn of the dent variety appears to be somewhat preferable to flint corn, for the grain is softer

and more easily masticated, and therefore likely to be somewhat better digested. The fact that the flint varieties of corn produce more suckers than the dent is possibly the reason why the ears of the flint varieties are generally better filled at the tip than is the case with the dent varieties; for the pollen produced by the tassels of the suckers must be useful in fertilizing the silks at the tips of the ears. The stalk of the flint varieties is in general more slender than that of dent corns, and, if well cured and fed without cutting or shredding, is more palatable; but this peculiarity of the stalk makes it somewhat more difficult to so build the shocks that they will stand securely while curing.

Many of the characteristics of dent varieties of corn have been indicated in what has been said in relation to flint varieties. In the great corn States the varieties of field corn under cultivation all belong to this class. Many varieties grow to enormous height, and are capable, with a sufficiently long season, of giving extremely heavy yields. On the other hand, there are numerous relatively small varieties, which require a comparatively short season, grown in the States of the northern Mississippi valley. Some of these varieties are desirable grain crops in the most favorable localities in Massachusetts, notably in the Connecticut valley; while in most parts of the State dent varieties are preferred for ensilage.

It is not the purpose of this article to go into detail in relation to corn as a garden crop. It seems worth while, however, to refer to the sweet varieties, on account of their possible use as forage crops. Sweet corn furnishes fodder of very superior quality for feeding green, and the medium to large varieties are well worth cultivating for that purpose. Sweet corn has sometimes been used as ensilage, but is not regarded as equally desirable with suitable flint or dent varieties for that purpose, on account of the fact that the resulting silage, under conditions in all other respects similar, contains a larger percentage of acid than does silage from either flint or dent varieties.

Good Seed of the Utmost Importance.

It is equally as true of varieties of corn as it is of breeds of live stock, that there is a wide variation in different strains or families of the same species or variety. There is well-bred and highly improved Longfellow corn, for example; and if Longfellow corn be the variety selected, it is seed with these characteristics that should be looked for. Not everything, unfortunately, sold under the name Longfellow is well bred and highly improved. It may be Longfellow corn, and still be greatly inferior to the product of a better breeder or grower. Heredity is of as great importance in the vegetable as in the animal world, and only from well-bred, well-grown seed can the best results be expected. The improvement of varieties of corn has received a great deal of attention during the past few years, both in the different experiment stations, especially of the great corn States, and on the part of individual growers. Great improvement has already been effected. A few States have corn breeders associations, and systems of registration of pedigree seed similar to those for live stock. New England corn growers have for generations used much care in the selection of seed, and the old New England varieties are many of them highly improved. It seems reasonable, however, to expect that, with the fuller knowledge of the present day and with the improved methods which have been put into successful practice in the west, still further improvement can be made. It seems, therefore, highly desirable that New England corn growers should systematically undertake such improvement. The

varieties which we have under cultivation can with little doubt be improved in either of two directions, viz., in composition, or in capacity for total yield of grain.

Improvement in Composition. — Improvement in composition must be made with reference to the use to which the crop is to be put. Western growers have found it possible within a few generations of seed to materially modify the composition of the grain. Their efforts have been directed toward modification in three distinct directions: (1) to increase the proportion of protein; (2) to increase the proportion of starch; (3) to increase the proportion of oil.

An increase in the proportion of starch or in the proportion of oil is desirable only if the corn is to be put to some special use. For the manufacture of starch, glucose, alcohol or whiskey, the starch is of course the important product, and a relatively starchy grain is most valuable for these purposes. If the production of corn oil is one of the important objects in view, then, of course, an increase in the proportion of this constituent is desirable. Massachusetts is not likely to produce corn for the manufacture of starch, glucose, alcoholic liquors or oil; the grain here will be used either as animal or human food. For this use, an increase in the proportion of protein is desirable. Our farmers at the present time expend a large amount of money annually in the purchase of stock foods rich in protein. If we could increase the proportion of protein in corn by even a few per cent, it would greatly diminish the necessity for such outlay. That such an increase in the amount of protein is possible can hardly be doubted. The proportion of this nutrient in different samples of corn is found to vary between about 7 and 13 or 14 per cent. Some of the western breeders have succeeded in effecting an increase of about 2 per cent in protein within a very few seed generations. To determine definitely the proportion of protein in Indian corn, a chemical analysis is of course necessary; but examination of the kernels affords clear indications as to the composition. If when cut through the middle the kernel shows a relatively small proportion of the white starchy material and a large proportion of the intensely hard, more or less glossy and slightly translucent, material and a large germ, the grain will be rich in protein. It is fortunately true that all the kernels borne upon one cob usually exhibit similar characteristics. It follows, therefore, that, if the examination of a few kernels from different parts of the ear indicates that it excels in the proportion of the constituents just pointed out, it will be rich in protein; and the balance of the kernels of such an ear should, of course, be planted if increase in protein is the object in view.

Improvement in Yield. — When improvement in yield is the object, the first step should be to select a good variety. It would be unwise to attempt the improvement of a poor variety. It could be done, but it is unnecessary, for there are already numerous excellent varieties. From such a variety, select a considerable number of ears which approach the ideal type. Western growers advise the very careful selection of 100 ears from the general crop. These ears should then be more critically examined and compared with each other, and about one-half, including only those which appear to be very superior, should be reserved for yet closer examination. The next step should be to shell these specially selected ears and carefully weigh the grain, and, in the light of the facts thus disclosed, still further reduce the number. Western corn breeders usually advise taking 25 ears for the breeding plot. They generally recommend planting two rows of 50 hills each from each ear. If 25 be the number selected, then rows

Nos. 1 and 26 should be planted with corn from ear No. 1, rows Nos. 2 and 27 with corn from ear No. 2, and so on. This duplication is practised in order that the danger of making a wrong selection on account of inequalities in the fertility of the soil in different parts of the plot may be reduced to a minimum. It is best to locate such a plot in the midst of a larger field of the same variety, in order to insure thorough pollination. Each of these rows is to be harvested by itself, the grain shelled, and the product of only a few of the ears giving the high yields reserved for the breeding plot of the next year; and, in order to effect the utmost possible improvement, only the best ears from these best rows should be selected for further work. The balance of the first year's breeding plot may be used for the general crop of the following year. Some breeders advise that in the breeding plot of the second year, including perhaps the product of the four or five best ears of the first selection, the plants descended from all except one of the original ears should be detasseled, in order to make it certain that cross and not close pollination must take place in the majority of ears in the plot. There is much evidence to show that pollination from plants of remote ancestry gives more vigorous and productive seed than pollination from closely related plants. This plan, therefore, of detasseling all except one of the types of the breeding plot, would seem to be wise.

Methods of Original Selection. — Whether the object be to select very critically, with the idea of attempting improvement by systematic breeding, or simply the selection of ears to be used for seed for the general crop, three distinct methods may be followed: (1) the selection may be made from the bin; (2) it may be made when husking; (3) it may be made in the field.

Selection in the bin has the advantage that the best may be picked out from a very large number. Selection when husking perhaps will possess the same advantage if the huskers are persons of sufficient intelligence; and it will have the further advantage that the selected ears may be promptly and carefully dried, which, particularly when the seasons are cool and short, is a matter of the utmost importance. Many ears of corn, which if promptly dried would have made excellent seed, have their vitality much impaired if cured with the balance of the crop in the bin. Where the work is done upon a relatively small scale, the old plan of trussing the selected ears and hanging them where there will be the fullest possible circulation of air has much to commend it. If the work is to be done on a larger scale, a special drying room with artificial heat is desirable.

Selection in the field has the great advantage that the character of the plant, as well as the character of the ear, can be noted. If selection be made in the bin, or even while husking, it may very well happen that the ears which seem to be of exceptionally good quality are of that character simply because they had an exceptional opportunity to develop in the field, — perhaps because the plants producing them stood in spots more fertile than the average, perhaps because they had more room for development. Such ears will not necessarily transmit their qualities. From this point of view, it seems much wiser to select in the field, and to take the ears which are best under average field conditions from plants which exhibit the desired characteristics as to height, size of stalk, number and size of ears, etc.

The Vitality of the Seed. — The planting of seed which does not germinate satisfactorily is not infrequently the occasion of disappointment and loss. Western producers of seed corn are prepared to furnish unshelled seed corn, every ear of which has been separately tested.

This may seem to be a formidable undertaking; but, since the quantity of corn required to plant a given area is relatively small, it is not, after all, a very great amount of trouble. It is necessary only to remove some five or six kernels from different parts of each ear, and to test each lot by itself. There are many relatively easy methods of determining the percentage of germination of seed corn. If the ears are to be tested separately, perhaps one of the easiest methods will be as follows: On a piece of canton flannel of suitable size mark off with a heavy lead pencil squares about two inches on a side. Thoroughly saturate the cloth with water, and then place it in the bottom of a shallow tray of suitable size. The squares and the ears should be correspondingly numbered. It is then an easy matter to determine the germinating quality of the grain from each of the selected ears. After the kernels have been placed in the squares upon the moist canton flannel, they are to be covered by a second piece of the same goods, which also is first thoroughly moistened. If over the whole a pane of glass is then laid, it will probably be unnecessary to supply additional moisture. The corn will germinate most perfectly at temperatures ranging from about 70 to 80 degrees. If corn be tested by this system, it should be the rule to reject all ears in which the selected kernels do not all germinate. If one does not care to take the amount of trouble necessary to carry out this system of testing, it is at least worth while to test a sample of the mixed seed which is to be planted in the field. One of the most convenient methods of doing this is to fill the bowl of a soup plate with sand of medium grade, add water until it stands on the top, then incline the plate and let the surplus water flow out. When it ceases dripping, place say 100 kernels of corn on the sand, press them down very slightly into it, but do not cover them, lay a pane of glass over the top of the plate, and then reverse a second soup plate of the same size as the first over the glass. This is for the purpose of excluding the light, which is unfavorable to germination. Such a germinating apparatus will give satisfactory results in any ordinary living-room. A sample of corn in which more than 5 to 10 per cent of the seeds fail to germinate must be regarded as unsatisfactory.

Soil Adaptation. — In seasons in which the temperature is normal or above normal, fairly satisfactory crops of corn can be produced upon soils of almost any type, if not actually wet. Corn is very impatient of imperfect drainage. It does best when the temperature of both soil and air is high, provided the soil, while not being wet or holding stagnant water within a distance which should not be less than 4 or 5 feet below the surface, is capable of supplying the needed moisture. While the experience of our farmers amply demonstrates the correctness of the above statement, it is nevertheless true that corn in average seasons is most at home and will give best results upon the warm medium loams. Here the crops will not be so early as on soils of coarser texture whose temperature averages higher, but the crops are likely to be larger, especially in seasons when the rainfall is somewhat deficient during any part of the period of rapid growth.

Position in the Rotation. — The necessity for rotating corn is less than in the case of many of our crops. Even when cultivated many years in succession upon the same field, it still as a rule remains exceptionally free from disease or insect enemies, and with fairly liberal applications of manures or fertilizers will still give satisfactory crops. Numerous instances are on record where corn has been grown for twenty or more successive years in the same field, and the crops at the end of the period were equally as good as at the beginning. Not-

withstanding these facts, it is not the best farm practice to put corn many years in succession upon the same ground; better economical results can be obtained if it is grown in rotation. On many Massachusetts farms where corn is or should be an important crop, the only other crop occupying any considerable area is hay, — mixed grass and clover. Under these conditions, a very satisfactory rotation is mixed hay for either two or three years, according to the quantity desired, corn to be husked for grain one year and ensilage corn one year. Corn does exceptionally well on a mixed grass and clover sod; and, as has been pointed out in my articles on the hay crop in Massachusetts, seeding to grass and clover in ensilage corn seems to be one of the most satisfactory methods, unless the soils are very deficient in water holding and conducting capacity. The decaying roots and stubble of the clover sod will furnish to the succeeding corn crop a large proportion of the nitrogen needed. Thus, for example, on one of the plots of the experiment station in Amherst, which for fourteen years had received an annual application of fertilizers supplying only phosphoric acid and potash, and without any application of nitrogen throughout the entire period, corn gave a yield at the rate of about 56 bushels of shelled grain per acre, on a freshly turned mixed grass and clover sod.

Manures and Fertilizers.

On all farms where stock is kept and where the principal crops are mixed hay, corn and potatoes, the corn field is without doubt the best place in which to use the manure. Corn is a rank feeding crop, and capable of utilizing to great advantage elements of fertility supplied early in the season in relatively unavailable forms, such as are found in farm manures. The principal reason why corn, better than either mixed grass and clover or potatoes, will utilize the elements of value in manures, is because its principal growth is made so much later in the season. Previous to the time when it makes heavy demands upon the soil, the elements which are unavailable at the time of application of the manure will have been rendered available through the action of natural agencies. Every farmer of experience knows that splendid corn crops can be raised upon manure alone; and every such farmer knows also that on seeding after the cultivation of corn on heavy applications of manure fine crops of timothy hay can be produced. Under some circumstances, the use of manure alone, then, in raising the corn crop may prove entirely satisfactory; but it is the belief of the writer that, under the average conditions existing upon the dairy farm at least, there is a better way than to depend upon manure alone. Especially is this true if the hay produced upon the farm is all fed to the farm stock. If the hay is to be fed out on the farm, it is highly desirable that it contain a liberal admixture of clover. If corn crops are raised on heavy applications of manure alone, clover is not likely to do so well when the land is seeded as it will in those cases where the application of manure is more moderate, and is supplemented by small quantities of something supplying phosphoric acid and potash. This fact has been pointed out and the subject discussed at some length in the writer's articles on the hay crop and on clovers,[1] and it seems unnecessary to present facts and figures here to establish the point. It will be useful, however, to point out the difference in results produced upon one of the fields of the experiment station at Amherst under the two systems of fertilization. This field was laid out for the purpose of this experiment in 1891, and since that time it

[1] Agriculture of Massachusetts, 1904, 1905 and 1906.

has produced ten corn crops and six hay crops. To one-half the field, which includes an acre of land, manure has been applied annually at the rate of 6 cords per acre throughout the entire period, with the following exceptions: it was left without manure in the years 1897, 1902 and 1905, and in 1898 the rate of application was 4 cords per acre. These were years during which the field was in mixed grass and clover, and all or a portion of the usual application of manure was omitted, as experience indicated that the crops would lodge badly should it be applied. On the other half of this field manure was applied at the rate of 3 cords per acre in 1891 and 1892, and during the balance of the time, with the exceptions noted below, at the rate of 4 cords per acre. No manure whatever was applied in 1897, 1902 and 1905, and in 1898 the rate of application was at the rate of 2 cords per acre. In connection with the smaller quantities of manure used on this part of the field, an annual application at the rate of 160 pounds per acre of high-grade sulfate of potash has been made, except in the years when no manure was applied. In these years the potash also was withheld. We have in this field, then, an excellent opportunity to compare the results of the two systems of corn raising, and the averages to date are as follows: —

On the large application of manure alone, the average rates of yield per acre have been: shelled corn, 61.8 bushels; stover, 4,611 pounds.

On the smaller application of manure, combined with the potash salt, similar averages have been: shelled corn, 58 bushels; stover, 4,342 pounds.

It will be noted that the yield on the larger application of manure alone has been at the rate of 3.8 bushels of grain and a little over 250 pounds of stover greater than on the smaller application of manure with potash. The hay crops have been slightly larger on that part of the field receiving the larger application of manure alone, the average difference amounting to about 400 pounds in the first crop and a little less than 300 pounds in the rowen crop. There has been considerable difference in the feeding value of the hay produced under the two systems of manuring. That produced on that portion of the land receiving the lesser quantity of manure and potash has always contained a materially larger proportion of clover, and must therefore have had a higher nutritive value. On this point we have no definite data. It is customary, in estimating the cost of crops, to figure manure as costing about $5 per cord applied to the field. On this basis, and charging the potash salt used at cost, the money difference in the cost of the materials applied to the two parts of this field has amounted to about $6.50 per acre annually. The crops produced on the larger application of manure do not exceed those produced on the smaller application with potash by a sufficient quantity to cover this excess in cost. It is the writer's belief, based upon further experience with other fields, that the products on that part of this field receiving the lesser amount of manure and potash would have been materially increased by the annual or at least occasional application of basic slag meal, which would supply both phosphoric acid and a considerable excess of lime, which would have proved of value in maintaining the soil in that sweet condition which is essential for the best results with the corn crop. It is the writer's conviction, therefore, based upon extended experience, that it will prove the wiser policy on most farms to use manure in raising the corn crop in rather moderate amounts, supplementing it as above indicated by annual applications of basic slag meal and a potash salt. It seems probable that manure at the rate of about 4 cords, slag meal at the rate of 300 or 400 pounds, and

high-grade sulfate of potash at the rate of about 125 to 150 pounds, will give results highly satisfactory both in the product of corn and in the product of hay rich in clover on seeding.

That corn can be profitably produced on fertilizers alone is fortunately thoroughly established by experiments in progress in the experiment station. A field containing an acre of land was laid out for an experiment in raising corn on fertilizers in 1891. Since that date ten corn crops have been produced on one half of the field and eight upon the other. The land has been seeded three times, and each time has remained in mixed grass and clover two years. Two combinations of fertilizers have been under comparison: one of these has given an average yield of 56 bushels of shelled grain and 4,484 pounds of stover per acre; the other, 52½ bushels of shelled grain and 4,615 pounds of stover per acre. The hay crops have averaged on the first system of manuring 3,557 pounds per acre for the first crop and 993 pounds for the second. Under the other system of manuring, the average yields have been 3,696 pounds for the first crop and 1,152 for the second crop. It will be seen, therefore, that the fertilizer combination which gave the larger corn crop proved inferior to the other for the production of hay. The principal differences between the two systems are as follows: the first combination of fertilizer materials furnished materially less potash and more phosphoric acid and slightly less nitrogen than the second. The second combination was made very rich in potash and light in phosphoric acid. The superiority of the combination richer in potash for the hay crop is without doubt connected with the fact that the supply of potash was so much more liberal. The writer believes, in the light of his extensive experience, that the amount of phosphoric acid in the second combination might with distinct advantage have been increased. It has been noticed especially that the corn crop starts very slowly on the combination of fertilizers containing so small an amount of phosphoric acid. It is now very generally understood that a rather free use of highly available phosphates goes a long way in insuring the rapid progress of the crop. It is the writer's belief that the proportion of phosphoric acid usually found in special corn fertilizers is needlessly high, and that the proportion of potash in such fertilizers is often much too low. He is equally convinced that somewhat more phosphoric acid than he formerly believed to be essential will prove useful. In the comparisons in question, phosphoric acid is contained in the fertilizers used under the first system at the rate of 180 pounds per acre, actual potash at the rate of 77 pounds; in the second combination (richer in potash), phosphoric acid was applied at the rate of only 50 pounds per acre, actual potash at the rate of 125 pounds. The writer is now inclined to believe that an increase in the amount of phosphoric acid to a total of about 100 pounds per acre would prove useful. This he believes may wisely be supplied in the form of basic slag meal. The best source of potash, in the writer's opinion, is the high-grade or low-grade sulfate. It is true the muriate might give an equally good crop of corn, but on many soils and in many seasons at least, the clover in the succeeding hay crop will make a less satisfactory showing than where one of the sulfates is used. He is inclined to recommend, therefore, a fertilizer application for corn at the following rates per acre: —

	Pounds.
Nitrate of soda,	100
Sulfate of ammonia,	100
Tankage, or dry ground fish,	200
Basic slag meal,	500
High-grade sulfate of potash,	200 to 250

In the experiments to which reference has been made, the manure employed has always been spread after plowing, and deeply worked in by the use of the disc harrow. Fertilizers have in all cases been applied broadcast after plowing, and harrowed in; and, wherever the soil is in a fair condition of fertility, it is the writer's belief that these methods of application are likely to prove most satisfactory. Hill or drill application of fertilizers may, on the other hand, prove desirable if the fertility of the field is relatively low.

There is, of course, a possible question whether such results as have been obtained in the fields referred to in Amherst will be obtained under a similar system of using manures and fertilizers in other parts of the State; but the experiments of the writer with corn in different parts of the State tend to show that, while the rather liberal use of potash salts which has been recommended may not prove in all cases equally beneficial in other localities as in Amherst, they will nevertheless in the majority of instances prove distinctly beneficial. Of the three fertilizer elements, potash, nitrogen and phosphoric acid, potash on the average in the experiments in different parts of the State has increased the corn crop much more than either of the other elements. In a series of experiments conducted in 1890, thirteen fertilizer experiments with corn were carried out in different parts of the State, one each in the counties of Essex, Middlesex, Plymouth, Bristol, Barnstable, Worcester, Hampshire, Hampden, Franklin and Berkshire. The average increases in crops caused by the several fertilizer elements were at the following rates per acre: —

	Shelled Grain (Bushels).	Stover (Pounds).
For potash,	11.3	1,308
For nitrogen,	4.7	389
For phosphoric acid,	3.6	162

On one farm in Hadley, on the alluvial soil of the Connecticut valley, the potash gave an average increase at the rate of 48 bushels of shelled grain per acre, nitrogen at the rate of 10 bushels, phosphoric acid at the rate of 1.3 bushels. On a farm in Essex County, upon soil under a sufficiently high state of cultivation to produce an average crop at the rate of about 65 bushels per acre without manure or fertilizer of any kind, an application of muriate of potash at the rate of 160 pounds per acre gave an increase in the crop amounting to about 15 bushels; nitrate of soda at the rate of 160 pounds increased the crop at the average rate of only 4.7 bushels; phosphoric acid at the rate of only 1.4 bushels. In the light of these facts, it is believed that the farmers of the State in raising corn will find it distinctly to their advantage to see to it that the fertilizers used contain more potash than is common in commercial corn fertilizers. The advantages of this practice will show not only in the corn crop, but in the far better clover crops which will follow.

Planting the Crop.

One of the first things to be thought of in preparing to plant the corn crop is the preparation of the seed. Seed corn, as is generally understood, keeps far more safely on the cob than shelled. It is not best to shell long before the seed is to be used, although this, of course, may be done provided the ears have been very thoroughly dried. The

common practice of shelling off and rejecting the grain both at the tip and butt of the ear is to be strongly recommended. The kernels of these portions of the ear are often abnormal in shape and in size. If they germinate, they are likely to produce more feeble plants than the normal full-sized kernels of the other parts of the ear. Moreover, if the corn is to be planted by machine and in hills, it is a very great advantage to have the kernels of substantially even size and shape, for then the machine can be adjusted to drop precisely the required number, — for example, four kernels to the hill; and well-made machines will do this in about 95 out of 100 hills, and in the balance of the hills there will be only a very small variation. If, on the other hand, the grain from the tips and butts is included, the number of kernels dropped per hill will be quite uneven. Special treatment of seed grain with a view to protecting it either from insects or the ravages of the crows and other birds is sometimes adopted, but is not to be recommended if it can be avoided, for germination is better without. If something must be done to protect from crows, the best method seems to be first to soak the corn in hot water, then to allow the corn to drain off, and while it is still warm and moist stir in a very small quantity of tar. The amount used should be sufficient only to coat each kernel with an extremely thin film. Plaster or air-slaked lime should then be added in sufficient quantity to dry the grain. Any excess of lime or plaster can be sifted out. If the work is properly done, this treatment interferes but little either with planting or with the germination of the seed. Numerous experiments have been tried to determine whether hill or drill planting will give more satisfactory yields. Provided the total number of plants on a given area is substantially even, no great differences in product have been noted. On our New England fields, which are often comparatively rough, it is difficult to plant satisfactorily with a machine in hills; but there are a number of good machines which do excellent work in drill planting, which in the writer's judgment is likely on the whole to be most satisfactory. The distance between plants in rows and the number of plants in a hill must vary with the variety. For the ordinary types of field corn suited to the climate of New England, hills about 3½ feet apart in each direction and with three to four plants in a hill, or drills 3½ feet apart with plants standing on the average about 10 inches apart in the drill will generally be found satisfactory distances. As is generally understood, nothing, is gained in planting corn exceptionally early. The Indian rule, to plant when the leaves of the oak are as large as the ears of a squirrel, seems to be as good a rule as any.

Tillage.

This article has already reached such length that any extended discussion of methods of tillage would carry it beyond the assigned limits. Modern methods of tillage are, however, in general pretty well understood. It is recognized that the policy should be to prevent weeds from growing, not to destroy weeds; that it is highly important to maintain a surface mulch of fine, mellow earth (dust mulch, as it is often called). Accordingly, the smoothing harrow is not infrequently used in the corn field, sometimes before the grain is up. Later, and until the grain reaches a height of several inches, weeders are employed; and when the corn becomes so large that the use of these would seriously injure it, cultivators are set to work. It is now generally recognized that shallow-working cultivators which do not ridge the earth are preferable to any other form. Level culture will ordina-

rily give better results than hill culture, and when corn is grown in large fields, a riding or sulky cultivator working in two rows at a time is the most desirable form of implement. Little or no hand hoeing should be required.

Harvesting the Crop.

If one grows corn as a field crop for husking only, and upon the scale usual on New England farms, it may be doubted whether it will pay to purchase a corn harvester; but where ensilage as well as field corn is grown, a self-binding harvester, which is a necessity in handling ensilage corn, may be used with advantage in harvesting the field crop; for the bundles as bound and left upon the ground by the harvester can be readily set up into shocks, which stand more securely than shocks of unbound corn. Corn so put up can be husked without unbinding, so that the stover can be conveniently handled in bundles. In cases where a machine is not available, a corn knife and horse for shocking furnish the needed equipment. A rope with a hook in one end for drawing the tops of the shocks firmly together is of great assistance in so setting them up that they will stand securely through the autumn storms. Binder twine furnishes satisfactory material for binding the tops of the shocks.

In some parts of the State it is still the practice to cut the stalks just above the ears as soon as the latter are beginning to glaze. Under this system, the food value of the part of the stalks cut is likely to be greater than if the whole plant be allowed to stand until the corn is ready to shock, as in the more modern method. If the practice of top stalking be followed, however, the food value of the part of the stalk below the ears is seriously reduced, as the result of long exposure to the autumn storms. The total amount of labor, moreover, is greater in this system than in the system of cutting and shocking, and there can be no doubt that the latter system should usually be followed. Under this system, flint varieties should be cut as soon as they are fully glazed. Dent varieties should be cut when the dent is well defined in the ends of the kernels. Considerable ingenuity has been exercised in the effort to produce a satisfactory husking machine. A number of machines are manufactured which will do the work; but the general consensus of opinion among those who have tried machines for husking is that the economical advantage is at best doubtful, and the greater part of the enormous corn crops of this country is still annually husked by hand. Corn stover in some seasons and with some varieties is sufficiently well cured to keep satisfactorily if stored in mows under cover; but in the writer's judgment it will usually keep more satisfactorily in stacks of moderate size in the open air. It is sometimes hauled to the barn late in the fall or early winter, and run through an ensilage cutter or a shredding machine and then packed in a mow, or, if available, in a silo. Such cut or shredded stover will not keep satisfactorily in a silo unless it is considerably moistened as it goes in, in order to facilitate better packing; and unless it is especially well cured, it is hardly likely to keep well in large bulk in the mow. It seems to the writer preferable under most circumstances to take the stover from the stacks in relatively small amounts, cutting or shredding at one time only a sufficient quantity to last a week or two. This plan, of course, cannot be conveniently followed unless the farmer owns his own machine and power. Shredded stover, if satisfactorily kept, is much more palatable than that which is simply cut. It will be consumed with far less waste than stover which is fed without special preparation.

SERIES OF 1907. VOL. 20. NO. 2.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF JUNE, 1907.

PLUM CULTURE.

ISSUED MONTHLY, MAY TO OCTOBER, BY STATE BOARD OF AGRICULTURE, STATE HOUSE, BOSTON, MASS.

J. LEWIS ELLSWORTH, *Secretary.*

ENTERED JUNE 3, 1904, AT BOSTON, MASS., AS SECOND-CLASS MATTER, UNDER ACT OF CONGRESS OF JUNE 6, 1900.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1907.

Approved by

The State Board of Publication.

Crop Report for the Month of June, 1907.

Office of State Board of Agriculture,
Boston, Mass., July 1, 1907.

Bulletin No. 2, Crop Report for the month of June, is presented herewith. At the close of this issue is an article on "Plum Culture in Massachusetts," by Prof. F. A. Waugh, professor of horticulture at the Massachusetts Agricultural College. Professor Waugh has paid a great deal of attention to this fruit, having experimented with and written of its management to a considerable extent, and is perhaps the best-posted man, in this section of the country at least, with relation to the plum and its possibilities. The article is direct, concise and full of valuable information. It should prove of great value to all interested in this fruit.

Progress of the Season.

Preliminary returns to the Crop Reporting Board of the Bureau of Statistics of the Department of Agriculture (Crop Reporter for June, 1907) on the acreage of spring wheat sown indicate an area of about 16,464,000 acres, a decrease of 1,242,000 acres, or 7 per cent, as compared with the final estimate of the acreage sown last year. The average condition of spring wheat June 1 was 88.7, as compared with 93.4 last year, 93.7 in 1905, and a ten-year average of 93.3. The average condition of winter wheat was 77.4, as compared with 82.9 on May 1, 1907, 82.7 on June 1, 1906, 85.5 in 1905, and a ten-year average of 81.1.

The total area reported in oats is about 31,491,000 acres, an increase of 532,000 acres, or 1.7 per cent, as compared with the final estimate of the area sown last year. The average condition of oats on June 1 was 81.6, against 85.9 in 1906, 92.9 in 1905, and a ten-year average of 89.7.

The acreage reported under barley is less than that finally estimated as sown last year by about 171,000 acres, or 2.7 per cent. The average condition of barley was 84.9, against 93.5 on June 1, 1906, 93.6 in 1905, and 90.2 the mean of the corresponding averages of the last ten years.

The total area estimated to be planted to cotton is 11,000 acres greater than that found to have been planted last year. The average condition of the growing crop May 25 was 70.5, as compared with 84.6 per cent and 77.2 per cent at the corresponding dates in 1906 and 1905, respectively, and a ten-year average of 83.6 per cent.

In Massachusetts the acreage of oats compared with that sown last year was given as 100, and the average condition June 1 as 95; the average condition of winter rye as 88; the acreage of clover as 100, and the average condition as 92; the average condition of spring pasture as 90; the average condition of apples as 86; the average condition of peaches as 50; the average condition of blackberries as 85; the average condition of raspberries as 85; the average condition of cantaloupes as 87; the average condition of asparagus as 80; the average condition of cabbages as 85; the average condition of onions as 90.

Temperature and Rainfall for the Whole Country.

[From National Weekly Weather Bulletin.]

Week ending June 3. — On the Pacific coast and over western portions of the middle and northern Plateau regions the week was warmer than usual. In the Rocky Mountain region and all districts to the eastward, with the exception of the western portion of the Florida peninsula, the week was colder than usual, the deficiency in temperature ranging from 6° to more than 12° per day. The rainfall was in excess of the average on the Atlantic coast from southern New England to the Carolinas, in the Ohio and central Mississippi valleys, over the northern portion of the East Gulf States, and from the lower Mississippi River westward to central Arizona. There was less than the usual rainfall over a large part of the interior of the east Gulf States, in northern New England, the lower Lake region, upper Ohio

valley, and generally from the upper Lake region westward to the Pacific coast.

Week ending June 10. — The temperature was normal in southern Georgia, in Florida and on the immediate Gulf coast. Throughout the Rocky Mountain and Plateau regions, the central valleys and Lake region and in the Atlantic coast districts northward of Georgia the mean temperature was below the normal, the deficiency ranging from 6° to 9° per day from the Missouri valley eastward to New England. No appreciable amount of rain fell over the Southern States. Showers giving from one-half to one inch of rainfall occurred in the lower Ohio valley, lower Lake region, Middle Atlantic States and New England. In the lower Missouri and central Mississippi valleys and over the central portion of the upper Lake region very heavy rains occurred.

Week ending June 17. — The mean temperature of the week exceeded the normal over the northern part of the upper Lake region, in southern Florida and from the west Gulf coast northward to Canada. In all districts east of the Mississippi River except the upper Lake region the week was colder than usual. In the middle and northern Plateau regions, the lower Lake region and from southern New England to North Carolina the daily deficiency ranged from 6° to more than 12°. The rainfall was unusually heavy for the season in northern California, Oregon and adjacent parts of Washington and Idaho. East of the Rocky Mountains the rainfall for the most part was below the average. However, portions of the central Gulf and Middle and South Atlantic States, Lake region and upper Ohio, Missouri and Red River of the North valleys received amounts in excess of the normal.

Week ending June 24. — The temperature was below the normal in eastern and southern California, throughout the Plateau and Rocky Mountain regions and on the immediate middle and south Atlantic coasts. In the central valleys, Lake region, New England and the northern portion of the Middle Atlantic States the mean temperature was above the normal, the average daily excess ranging from 3° to 6° over the more northerly portions of these districts. In the South-

ern States the mean temperature was nearly normal. Heavy rains fell in central Texas, Oklahoma, Kansas, western Missouri, southeastern Nebraska and Montana, and there was more than the average in portions of Iowa, Minnesota and the upper Lake region, and over limited areas in the Middle Atlantic States and New England. The rainfall was below the normal in other sections, large parts of the country receiving only light showers or inappreciable amounts.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending June 3. — New England. Boston: The mean temperature was much below the normal. Frost occurred on the 29th, when the minimum temperature was near freezing, except in the coast districts. The precipitation was slightly below the normal in the interior of the northern portion and above normal elsewhere, copious rains occurring on June 2. The first five days were clear or partly cloudy; the last two days were cloudy; the duration of sunshine was near the average.

Week ending June 10. — New England. Boston: Local showers were frequent. The precipitation was near the normal and generally sufficient. The mean temperature was higher than last week, but below normal, the average of the maximum being near 70°. The sunshine was deficient.

Week ending June 17. — New England. Boston: The mean temperature was higher than the preceding week, and more seasonable; the nights during the fore part, however, were cool. The precipitation was very light and scattered, and rain is now needed. The sunshine was above the average.

Week ending June 24. — New England. Boston: The weather was warm and sunny, the maximum temperature being near or above 80° daily. The precipitation was local, the interior of Maine and Vermont receiving more than an inch, and the rest of the section amounts ranging from a tenth or less to eight-tenths of an inch. The sunshine was in excess of the average.

The Weather of June, 1907.

The unseasonably cool weather that characterized April and May continued until June 15. On the 16th the temperatures ranged in the 80's in nearly all sections, and this was the first day with summer temperatures since May 19, when the mercury registered in the 80's. From June 1 to 15 inclusive the daily average temperature was below normal, with the deficiencies ranging from 2° to 14°, and with a daily average deficiency for the fifteen days of 6°. From the 16th to the close of the month the daily temperatures were, with slight exceptions, above the seasonal average, with the excesses ranging from 2° to 14° above the June normal. The warmest days were the 18th, 25th and 26th, during which the maximum temperatures were 90° or above in all sections except those of the immediate coast. There was much cloudy, unsettled weather during the first two weeks of the month, with frequent showers of light to copious rainfall till the 10th. The last half of the month was quite dry, the rainfall being light and irregularly distributed. During this period there was much sunshine, and by the 25th there was a general need of rain. Owing to the uniformly cool weather during the first half of the month there were few thunderstorms, but during the rest of the month they occurred with near the average frequency, and in some instances with much violence. At the close of June the season was generally estimated as two weeks later than the average.

In the circular to correspondents, returnable June 25, the following questions were asked: —

1. What insects are proving injurious in your locality?
2. How is Indian corn looking, and what is the acreage as compared with previous years?
3. Has haying begun, and what is the prospect for the crop?
4. How does the acreage of early potatoes compare with previous years, and what is the promise for the crop?

5. How do early market-garden crops compare in yield and price with former years, and what is the prospect for those not yet harvested?

6. How does the quantity and price of dairy products and the supply and price of dairy cows compare with former years?

7. What is the condition of pasturage in your locality?

8. What is the outlook for such fruits and berries as are grown for market, naming them?

Returns were received from 142 correspondents, and from these returns the following summary has been made up: —

Insects.

Owing to the prevailing cold weather of May and the first half of June, insects have made but little progress, and were doing very little damage at time of making returns. Potato bugs are the insect most commonly spoken of as prevalent, but they appear to be doing considerably less damage than usual. Cut worms, tent caterpillars, currant worms and squash bugs are the only other insects which are reported by more than 6 correspondents. Others mentioned are the gypsy and brown-tail moth caterpillars, cranberry vine worms, wire worms, canker worms, asparagus beetles, onion maggots, flea beetles, the San José scale, spittle insects, the curculio, white grubs and the codling moth.

Indian Corn.

Indian corn was planted much later than usual, as a rule, owing to the cold weather of May, and much of it failed to germinate. Not all fields have been replanted, and it is probable that, with delay in planting, the acreage has been considerably reduced in the aggregate, certainly where the crop is grown as a grain crop. Owing to cold weather and failure to germinate, the crop is very backward and uneven, but is generally reported of good color, and coming forward rapidly with the recent warm weather. Much depends on the weather of the next two months as to whether the crop will mature.

The Hay Crop.

Haying had practically not commenced at the time of making returns, and many correspondents report that it will be two weeks later than usual. There is a great deal of variance as to the expectation for the crop, many saying that a good crop is expected, and others that grass is thin and short and that the crop will be light. So far as any general conclusion can be reached, it is that in eastern sections and in lower sections elsewhere the crop is generally fair to good, while in the hill towns, so called, and other elevated portions of the State, it is comparatively thin and light. A good rain would do much to improve the crop even there.

Early Potatoes.

There seems to be about the usual acreage of early potatoes planted, but they are somewhat backward and uneven, so backward, indeed, that there can hardly be said to be any likelihood of any "early" potatoes being secured. Many fields are just coming up, and it is altogether too early to make any statement as to probable yield.

Early Market-garden Crops.

Early market-garden crops are generally much later than usual, and in some sections very little garden truck has come into the market, with the exception of spinach and asparagus. Prices have accordingly ruled high for those which have been marketed, and the fortunate producers having them have secured good profits. Peas do not appear to be generally in the market. Asparagus yielded fairly well, with good prices. Later crops are making good growth, and promise well. All garden truck is coming forward rapidly with the warm weather.

Dairy Products and Dairy Cows.

The flow of milk seems to have been well maintained so far this season, and dairy products of all kinds are therefore in good supply. Milk generally brings better prices than in former years, but, as one correspondent expresses it, so do

grain and help. Butter has been unusually high during the winter, and prices have not yet dropped to the usual summer level. Dairy cows are in fair supply, with good ones bringing higher prices than in the immediate past. Good cows sell themselves at remunerative prices to the breeder.

Pasturage.

Pastures were generally reported as in good condition, with good feed; but indications were numerous that there would be a shortage in the immediate future, if rain did not come soon in considerable quantity. Our New England pastures are always dependent on a constant and well-distributed rainfall.

Fruits and Berries.

The strawberry crop is very late, but few native berries being on the market at the time of making returns. The indications were that there would be a fair crop, though not an unusually heavy one, with prices correspondingly good. Something depends in some sections on rain falling to help mature the crop. The early blossoms appear to have been in the main destroyed by frost. Blackberries and raspberries winter-killed in many sections, but where the canes are alive a heavy bloom is reported. Currants generally promise well. Wild berries bloomed full. Berries of all kinds are later than usual in blooming and ripening. There will be, practically speaking, no peaches, the bloom on those trees which escaped the severe winter having been destroyed by late spring frosts. Pears and plums also appear likely to be much lighter crops than usual. Apples set well for an off year, and the season is so backward that there had been no appreciable "drop" at the time of making returns. We must await later advices before forming any estimate as to the probable final result. Cranberries had not bloomed at the time of making returns, but the vines were reported as looking well.

NOTES OF CORRESPONDENTS.

(Returned to us June 25.)

BERKSHIRE COUNTY.

Tyringham (Edward H. Slater). — Indian corn is backward, but the acreage compares favorably with former years. Haying will be late this year, but the crop is now coming on rapidly. About the usual acreage of potatoes has been planted, but they are very backward. Market-garden crops are late, and none are harvested as yet. Butter is in light supply, and prices are somewhat higher than usual. Pastures are not looking as well as usual at this time. The outlook for apples is good, and there will probably be a good yield of blackberries and raspberries.

Stockbridge (F. A. Palmer). — Less corn than usual was planted, owing in part to the cold, wet season, and it is very backward. Haying is not yet begun, and there is only a fair crop promised. There is about the usual acreage of potatoes, but they are late, and it is too early to judge as to probable yield. Market-garden crops are backward, and prices are higher than usual; crops now coming on finely. Dairy cows and dairy products command better prices than formerly. Pasturage is in good condition. Berries are looking well, and the market is good; pears and peaches off; apples looking finely. Old mowings on damp land are looking poorly, as sweet grasses are running out and weeds taking their places.

Washington (E. H. Eames). — No insects are doing damage at present. Indian corn looks well, but is very late; acreage about as usual. Haying has not begun, and the crop will be late. Early potatoes are very backward, with about the usual acreage. Market-garden crops are not grown here. Dairy products are in good supply, with prices a little better than usual; dairy cows are in good demand, at good prices. Pastures look well, but need rain. Fruits and berries are not grown for market in this locality.

Richmond (Timothy B. Salmon). — Potato bugs are doing some damage. Indian corn is in fair condition, but is late. There will be a good crop of hay. There is about the usual acreage of early potatoes, and they are in good condition. Early market-garden crops have given average yields, and brought higher prices than usual, with a good prospect for later ones. Dairy products are average in quantity, and bring higher prices than usual; cows scarce, and bringing higher prices. Pastures are in good condition. Strawberries, raspberries and cherries promise well.

Hinsdale (Thos. F. Barker). — Potato bugs are doing some damage. Corn is very late, and unless we have rain soon the crop will suffer from drought. Haying has not begun, and without rain soon there will be none to do. Potatoes look fairly well, but need rain. Market-garden crops are not far enough advanced to allow a judgment as to yield. Dairy products bring little better prices than usual. Pastures were in good condition, but now feel the drought. Fruits and berries are all looking finely.

Peru (F. G. Creamer). — No insects are doing damage at present. Indian corn is very late, but the acreage is about the same as usual. Haying has not begun, and there will not be a very heavy crop. There is a large acreage of potatoes, but the promise of the crop is unknown, as they are just coming up. The price of butter is higher than usual; cows about as usual in supply and price. Pasturage is in good condition. There will be a large crop of blueberries; apples never bloomed fuller.

Windsor (Harry A. Ford). — Potato bugs and tent caterpillars are doing some damage. Indian corn never looked so poorly, and much has to be planted over. The hay crop promises well, but is late, and none has been cut as yet. Potatoes are two weeks or more late. Market-garden crops are not raised. Dairy products are equal to former years in quantity and price, if not higher. Pastures are in good condition, but rain would help them. The outlook for fruits and berries is good.

Cheshire (L. J. Northup). — Potato bugs and tent caterpillars are the most injurious insects. Corn is very backward, but is looking fairly well, with a full acreage. Haying has not begun, and the prospect for a full crop is not promising. Early potatoes are about a normal acreage, but it is too early to predict as to the crop. Early garden crops look good, but none have been harvested as yet. Prices of dairy products good, and prices of dairy cows above the normal. Too early to predict as to berries and fruits.

New Ashford (Elihu Ingraham). — Potato bugs are doing some damage. Indian corn is looking well, with the usual acreage. Haying has not begun, but there is prospect of a fair crop. There is the usual acreage of potatoes, and the crop promises fairly well. The quantity and price of dairy products compares well with former years. Pasturage is in good condition. Fruits and berries are not grown for market. All crops are two weeks late.

FRANKLIN COUNTY.

Rowe (N. E. Adams). — Tent caterpillars are the only insects that have appeared. Corn is two or three weeks late, some ensilage corn just coming up; acreage about as usual. No haying has been done, and the crop is a little below the average. The acreage of early

potatoes is about the same as usual, but they are not far enough advanced to judge as to yield. Dairy products bring rather higher prices than usual; cows about the same. Pasturage is good, but late in starting. Apple trees bloomed very full, some blossoms still on trees; too early to determine as to berries. Old mowings suffered badly from late frosts.

Leyden (Frank R. Foster). — Tent caterpillars are doing some damage, but are not as plentiful as usual. Indian corn is very backward, as May was too cold for it; acreage average. There will be a two-thirds crop of hay, and haying will be two weeks late. There is an average acreage of potatoes, but they are very backward. Market-garden crops are not raised here. Dairy products average in quantity, and bringing better prices than formerly; new milch cows scarce, and high in price. Apples promise an abundant crop.

Gill (F. F. Stoughton). — Indian corn is very late, and that planted early did not grow well. Haying has not begun, and there will be only a light crop. Cream brings higher prices than in former years. Pastures are in good condition. Raspberries and blackberries winter-killed; strawberries look well.

Ashfield (Albert Howes). — Potato bugs are beginning to appear. Late-planted corn came up well; acreage about 85 per cent of the average. Haying has not begun, and the crop appears to be very light. The acreage of early potatoes is fully up to the normal, and they appear to be looking well. There is no market-gardening done in this town. Quantity of dairy products normal, price higher than usual; cows scarce and high. Pasturage is in good condition. Strawberries bloomed well; plums and peaches scarce; small fruits not much raised.

Deerfield (Dwight A. Hawks). — No insects are doing damage. Corn is late, and not fully stocked, much has been replanted; acreage about as usual. Haying has begun, and the crop is slightly above the average. There is the usual acreage of early potatoes, and the vines are looking well. Quantity of dairy products less than usual, and prices about the same; cows are high. Pasturage is in good condition. Strawberries and red raspberries are very promising.

Sunderland (George P. Smith). — Cut worms and onion maggots are doing some damage. Corn did not germinate well, and much was planted over, so that the crop is very backward. Haying has not begun, but better than an average crop is promised. Potatoes look well, but are little grown for market. Market-garden crops are backward, and prices are good. Price of dairy products and dairy cows above former years; quantity same as usual. Pastures are in very good condition, but will need rain soon. Strawberries are just beginning to ripen; blackberries in blossom. Tobacco setting is nearly completed, with prospects good. Onions, late, and many fields thin.

Wendell (N. D. Plumb). — Tent caterpillars and potato bugs are

doing some damage. Acreage of Indian corn normal; crops very backward, and many have just finished planting. Haying is very backward, but an average crop is promised. The acreage of early potatoes is less than for many years, and the crop is two weeks later than common. Market-garden crops are not raised here. Dairy products are the highest for years; dairy cows in good demand, at fair prices. Pasturage is in very good condition. Strawberries, blueberries and cherries are very backward, but promise a large yield.

Northfield (T. R. Callender). — Tent caterpillars are numerous on fruit trees, and there are some striped bugs on melons and squashes. Indian corn is about ten days late, though gaining fast; acreage rather above average. Haying has not begun, but the prospect is good for a heavy crop, though rather late. Acreage of potatoes average; crop late, but looking well. All garden truck is late, and bringing high prices. All dairy products are in good demand, at good prices; dairy cows high. Pastures are in very good condition, but rain is badly needed. Apples promise a fair crop; strawberries light.

Orange (A. C. White). — There is but little trouble from insects. Corn is two or three weeks late in planting, and is small, but is of good color and growing rapidly. Haying has not begun; the crop started well, but without rain soon will be light. Pasturage is not up to the average in condition. The season is so cold and late that most crops will need an open fall in order to reach maturity.

HAMPSHIRE COUNTY.

Prescott (W. F. Wendermuth). — Insects are not troubling us much, perhaps potato bugs and cut worms are the worst. Acreage of Indian corn normal and crop two weeks late, but growing rapidly. Haying has not begun, and the crop will fall below normal without copious rains at once. Potatoes and market-garden crops are not grown here for market. Dairy products and dairy cows are both steadily advancing in price. Pastures are badly in need of rain. Apples bloomed well, but have not set very well; blueberries and huckleberries promise well; other fruits not grown in marketable quantities.

Enfield (D. O. Chickering). — Tent caterpillars and potato bugs are doing some damage. Corn looks well, but is backward; acreage fully up to the average. Haying has not begun, and there will be about an average crop. Acreage of early potatoes about the same as usual, and they promise well. Dairy products are about the same as in former years in quantity and price. Pastures are suffering from dry weather.

Belchertown (H. C. West). — No special trouble from insects as yet. Indian corn is backward, two weeks late, but is a good stand and growing well; acreage full average. No haying has been done as yet,

but there is a full average crop in prospect. The acreage of early potatoes is above that of average years, and they are looking remarkably well. There is about the usual quantity of dairy products; price somewhat higher for both cows and products. Pasturage is in very fair condition. Apples promise a two-thirds crop; no peaches; few pears; prospect for berries fair, but late.

Hadley (L. W. West). — Wire worms are doing some damage. Corn is very backward, with the usual acreage. Haying has not yet begun, but there will be about a medium crop. The acreage of early potatoes is about the same as usual; crop looking first rate, but backward. Very few market-garden crops are yet harvested; prices good so far. The quantity and price of dairy products and supply and price of dairy cows are fully up to the average of former years. Pastures are in good condition. Plums, early cherries and high-bush blackberries were killed by frost; strawberries promise a good crop, picking just commenced; peaches killed; small crop of pears; apples promise well. Rye looks remarkably well.

South Hadley (W. F. Person). — Indian corn is very late, and the acreage about one-third later than in previous years. No haying has been done as yet, but the crop looks well. The acreage of early potatoes is about the same as usual, but the crop will be late. Price of market-garden crops good, but all are backward. Dairy products are about the same in yield and price as in previous years. Pastures are in very good condition. Early apples promise well; winter apples poor; few cherries and currants; no pears.

Easthampton (Wm. C. Clapp). — Potato bugs, currant worms and cut worms are doing some damage. Corn is backward, but has grown rapidly during the recent warm weather; acreage full. Haying has not begun, but an average crop is in prospect. About the usual amount of early potatoes planted; looking well, but two weeks late. Asparagus is a short crop, with good prices; rhubarb a good crop, with good prices; lettuce has been high; warm weather will bring average crops. Dairy products are fully as high in price as in former years. Pastures are looking fairly well, but need rain. Strawberries are a full crop; cultivated blackberries winter-killed; red raspberries wintered well. Tobacco plants scarce, and setting late. Smaller acreage of onions than usual. Tomatoes were reset two or three times.

Southampton (C. B. Lyman). — There is no special trouble with insects. Indian corn is late, and is just coming up. Hardly any hay has been cut, and the prospect for the crop is fair. Early potatoes are mostly late, but are looking fairly well. There are no early market-garden crops this season. Quantity and price of dairy products are about normal. Pasturage is poor at present. Apples promise a fair crop; strawberries are just beginning to ripen; blackberries are in full bloom.

Chesterfield (Horatio Bisbee). — Tent caterpillars are doing some

damage. Indian corn is very backward, and much less than common has been planted. Haying has not yet begun, and it is too early to say what the yield will be. Potatoes are very small and backward, with perhaps the usual acreage. No market-garden crops are raised here. Dairy products do not vary much from other years in quantity and price. Pasturage is very good. Fruits and berries are not grown for market in this locality.

Cummington (S. W. Clark). — Tent caterpillars are present in the usual numbers. Corn is very small for this date, but growing fast since hot weather came; acreage a little below normal. Haying has not begun, but there is prospect of a good crop. No early potatoes here this year, as those planted early failed to germinate. Market-garden crops are not raised here. Quantity of dairy products a little light, creamery butter 4 cents a pound higher than last year; dairy cows sold well, and have been well cleaned out at prices a little above last year. Pasturage is at its best just now. We are looking for a fair crop of apples, pears, etc.

HAMPDEN COUNTY.

Tolland (Eugene M. Moor). — Cut worms are doing some damage. Indian corn is two weeks late, with about the usual acreage planted. Grass is late, owing to the cold weather, but there is prospect of a good average crop of hay. Dairy products are bringing better prices than usual; dairy cows 20 per cent higher than formerly in price and scarce. Pastures are in good average condition. Although a little late, fruits and berries will be good average crops.

Blandford (Enos W. Boise). — Tent caterpillars are very plenty. Acreage of corn normal, but very late, little being planted until into June; stand generally good. Haying has not begun, and grass seems thin, with prospect of a light crop. There is the usual acreage of potatoes, but they are late. Few market-garden crops are yet suitable for market, and prices are high. Dairy products are well up as to price and normal in quantity; dairy cows are held at high prices, and there are few for sale. Pasturage is short, and there is much complaint that fatting stock is not making the usual gains. Wild berries promise a full crop.

Russell (E. D. Parks). — Potato bugs are very plenty, and cut worms are working in some grass fields. Indian corn is very backward, with about the usual acreage; and hot weather should improve it very much. The hay crop is rather light, and is ripening fast, so that cutting will begin this week. Potatoes look well, but are very late. There are but small yields of market-garden crops. Dairy products are rather higher than formerly as a whole; cows high and scarce. Pastures are very good, but are getting dry; rain is needed. All fruits are very backward, and promise only small crops.

West Springfield (N. T. Smith). — There is less injury than usual from insects, but all the usual species are in evidence. Corn is small for the time of year, but of good color, some complaint of poor germination and uneven stand; average acreage. Little haying as yet begun; prospect for the crop good; clover unusually fine. Acreage of early potatoes about average; planting late, but crop coming on finely. Yield of market-garden crops normal, and prices slightly above average; all crops now growing well. Prices of dairy products slightly above average; good cows rather scarce and high. Pasturage is up to the average, but needs rain. Apples good; pears few; no peaches; strawberries good, with sufficient rain; raspberries and blackberries below average, on account of winter-killing.

Chicopee (E. L. Shaw). — Currant worms are doing some damage. Warm weather is starting corn to growing; acreage fully as large as usual. Haying has not begun; prospect for a good crop, though sorrel seems unusually plentiful. The acreage of early potatoes is small, and few fields are looking well. Few market-garden crops sold as yet, and prospects not very good. The price of milk is slightly increased, and the quantity cut down; good cows are scarce and high. Pastures are in good condition. Apples are looking well; not many pears set; no peaches; some plums; blackberries, raspberries and strawberries small yields.

East Longmeadow (John L. Davis). — Wire worms, cut worms and squash bugs are doing some damage. There is a large acreage of Indian corn, but it is coming up poorly, on account of wire worms and the cold weather. Haying has begun in a few places; new-seeded fields looking well, old fields fair. There are no real early potatoes, and the acreage is not as large as last year. There is not much in the market-garden line ready to harvest as yet. Quantity of dairy products short; price of milk ½ cent per quart higher than last year. Strawberries are about one-fourth of a full crop, owing to damage from frosts.

Wilbraham (H. M. Bliss). — Indian corn is backward, and the acreage not over half that of average years. Haying has not yet begun, but the crop will be nearly up to the normal. Early potatoes show a falling off of 25 per cent in acreage and 20 per cent in condition. Early market-garden crops did not do as well as usual, and later ones are very backward. Quantity and price of dairy products up to the average; dairy cows bring from $40 to $50. Pasturage is in good condition. The outlook for fruits and berries is good, except that they are very backward.

Palmer (O. P. Allen). — Only a few insects are in evidence. Indian corn is very small and backward, owing to the lateness of the season; acreage about as usual. Haying has not begun, and there will be an average crop. Early potatoes are about the same as usual; late in coming up, but promise the usual crop. Quantity and price of dairy

products are about the same as in late years. Pastures are in good condition, because of much rain. There will be few or no peaches or cherries; apples normal for off year; pears very few; plums promise fairly well; small fruits below normal.

Holland (Francis Wight). — Potato bugs are doing some damage. Indian corn is doing well now, but is two weeks late; acreage about the same as in other years. Haying has not begun, but the prospect is good for a good crop. The acreage of early potatoes is not above the average of other years. Quantity and price of dairy products and supply and price of dairy cows about as in other years. Pasturage is in good condition.

WORCESTER COUNTY.

Brookfield (F. E. Prouty). — No insects are doing damage. Indian corn is about two weeks late, with about the usual acreage. No haying has been done as yet, and the prospect is for an average crop. The acreage of early potatoes is about the same as usual, with promise for the crop fair. All market-garden crops are backward, and none harvested. Dairy products about as usual in supply and price. Pastures are in good condition, but need rain. The dry weather is hurting berries, but the outlook for fruit is good so far.

West Brookfield (Myron A. Richardson). — Potato bugs and currant worms are doing some damage. Indian corn shows only about half the usual acreage, and is small, with many fields only half germinated at first planting. Haying is backward, but an average yield is promised. The acreage of potatoes is about the same as usual, but the crop is backward. Early market-garden crops are not raised here. Dairy cows are high and scarce; butter and milk higher than for years. Pastures are in good condition, but need rain now. Outlook for berries good if drought does not continue too long.

New Braintree (C. D. Sage). — Very little damage from insects at present. Corn is very late, and not as much as usual has been planted. Haying has just commenced, with the prospect good for a full crop. Less potatoes have been planted than usual; very late, but looking well. Market-garden crops are little grown here. Price of dairy products somewhat higher than usual; demand for dairy cows good. Pastures are in good condition, but rain is needed. Very little fruit raised except apples, which promise well.

Oakham (Jesse Allen). — Potato bugs are doing some damage. Indian corn looks fairly well; acreage about as usual. Haying has not begun, and the crop is suffering greatly for lack of rain, without which it will be small. Acreage of early potatoes about the same as usual, and they are looking well. Market-garden crops are little raised. Quantity of dairy products about the same as usual; price of dairy products and dairy cows slightly advanced. Pasturage is good, but greatly needs rain. Apples, pears, grapes, huckleberries and blueberries have all blossomed well.

Petersham (B. W. Spooner). — Potato bugs are doing some damage. Indian corn came up very unevenly, and much has been replanted, while the crows are pulling badly. There is no haying as yet, and grass is looking fairly well. Since the warm weather potatoes have grown finely; acreage about the same as usual. No market-garden crops have been harvested as yet, and their yields are uncertain. Dairy products are higher than usual; good cows sell at from $40 to $75. Pasturage is in good condition. Fruits and berries are little grown for market. The ground is very dry, and rain is needed soon.

Templeton (Lucien Gove). — Potato bugs and currant worms are doing a limited amount of damage. Indian corn is very backward, and the acreage is less than usual. Haying has not begun, and rather a light crop is in prospect. Acreage of potatoes about as usual; crop very backward and uneven, with much seed rotted in ground. There is no material difference in the quantity and price of dairy products. Pasturage is not up to the average in condition. Strawberries are a light crop; scarcely any raspberries; full bloom of blackberries; blueberries full crop.

Gardner (W. E. Knight). — No insects are doing damage. Corn is three weeks late, with about the usual acreage. Haying will be two weeks late, and the crop is below the average. Potatoes are not grown for market here. Market-garden crops are not raised to any extent. Prices for dairy products are higher than usual; good dairy cows are scarce, and higher in price than formerly. Pasturage is in fair condition. Apples are below the average in promise.

Westminster (Alden J. Foskett). — No insects are doing damage. The season has been so late that corn is just coming up, and there will be a small acreage. Haying has not begun, and the prospect is good for a large crop. There is about an average acreage of early potatoes, which are looking well except that they are late. Market-garden crops are little raised. Quantity and price of dairy products about as in previous years. Pasturage is in very good condition. Apples promise a large crop; all other fruits will be scarce.

Princeton (A. O. Tyler). — Squash bugs are doing some damage. Corn is backward, with about the usual acreage. Haying has not begun, but the prospect for the crop is good if we have rain. There is about the usual acreage of early potatoes, and they are in good condition. Market-garden crops are not raised in this section. Dairy products and dairy cows both command higher prices than formerly. Pasturage is in good condition. All berries promise well; apples and pears good; no peaches.

Bolton (H. F. Haynes). — No insects are doing serious damage. Indian corn is very late, and generally poor. Haying has not begun, but a full average crop is promised. Not many potatoes have been planted, and few of them are out of the ground as yet. Asparagus was about a fourth of an average crop; very little market gardening done here. Cows are very high; prices for milk are not high enough to

satisfy the demands of the Board of Health. Pasturage is good, but feed is short because of lack of rain. Blackberries winter-killed in some places; strawberries suffered from frosts, but there will be a fair crop.

Sterling (Henry S. Sawyer). — Potato bugs and currant worms are doing some damage. Corn is looking well, but the acreage is smaller than usual. Very little haying has been done, but there is prospect of a good crop. About the usual acreage of potatoes has been planted, and they are looking well. Peas are in blossom; other garden crops late. Milk and butter are selling for good prices; dairy cows are selling well, at from $40 to $75. Pastures are in good condition. Strawberries are scarce and late; raspberries badly winter-killed; blackberries in blossom; cherries injured by cold weather.

Northborough (John K. Mills). — Insects are doing but little damage. Corn is late, but looking well; acreage about the same as last year. Haying has not begun yet, and the crop will not be more than an average one. The acreage of early potatoes is about the same as usual, but it is too early to judge as to what the crop will be. Early market-garden crops have been light, and prices somewhat better than usual. There is an average supply of dairy products, with prices a little higher than formerly; good cows sell readily at good prices. Pastures are good but need rain. Fruits and berries are late; strawberries will be an average crop.

Leicester (H. H. Kingsbury). — Potato bugs, squash bugs and spittle insects are doing some damage. Corn is very backward, with about the usual acreage. Haying has not begun, and the quantity and value of the crop depend on the weather conditions of the next two weeks. There is the usual acreage of potatoes, and they are growing very fast. The yield of market-garden crops has been short, but prices are good. Price of dairy products has kept up well with the quantity. The recent hot weather has made excellent pasturage, and rushed all vegetation. Blackberries and strawberries have a full bloom, indicating a good crop.

Oxford (D. M. Howe). — Indian corn is very backward. Very little hay has been cut, and the prospect is good for the crop. Quite a good many early potatoes are planted, and they look fairly well, considering the lateness of the season. Early market-garden crops are late. Dairy products are in good supply, at good prices; and dairy cows bring good prices. Pasturage is in excellent condition. Strawberries look well; none picked as yet; now selling at from 16 to 20 cents a quart.

Blackstone (O. F. Fuller). — Cut worms and San José scale are doing damage. Corn is backward, with about the usual acreage. Haying has not begun, but there will be a fair crop. Acreage of early potatoes about the same as usual, but the crop is backward. Yield of early market-garden crops about the same as usual, and prices higher.

There is a good market for dairy products, and butter has been high. Pasturage is in good condition. Apples, pears and peaches will be light crops.

MIDDLESEX COUNTY.

Sherborn (N. B. Douglas). — Potato bugs have appeared, but no insects are as yet very troublesome. Indian corn is very backward and uneven; acreage larger than usual. Very little hay has been cut, and the prospect is that there will be a large crop, with much clover. There is about the usual acreage of potatoes, which look well, though backward. There is about the usual supply of dairy cows; prices for dairy products a little better than last year. Pasturage is in very good condition. Strawberries look well, but need rain.

Framingham (J. S. Williams). — Potato bugs, cucumber beetles and cut worms are troublesome. Both Indian and sweet corn have been planted over, and both are looking poorly, although improving with warm weather; acreage up to the average. Haying has begun in a small way; grass very thick, and crop undoubtedly heavy. Potatoes are backward, but it is far too early to estimate crop. The yield of market-garden crops has not been large, but good prices have been obtained, and the outlook is good. Milk brings rather more than formerly, supply steady; price of cows normal. Pastures are looking well at present. Apples and pears set well; outlook for wild berries good; strawberries set heavily; raspberries and blackberries will blossom profusely.

Marlborough (E. D. Howe). — Brown-tail moth caterpillars and curculios are doing some damage. Indian corn is looking sickly, and is three weeks late; acreage slightly reduced. Haying has begun on orchard grass and June grass, with prospect for a good crop. There is about the usual acreage of early potatoes, but they are growing slowly. Market-garden crops are not much raised in this locality. Milk is in full supply, and dairy cows are high. Pasturage is getting short. Strawberries promise well; raspberries just blossoming.

Maynard (L. H. Maynard). — Brown-tail and gypsy moths are numerous, and potato bugs and cut worms are also doing some damage. Indian corn looks well, but is about two weeks late. Haying has not begun, and the prospect is good for a large crop, with an unusual amount of clover. The acreage of potatoes is about as formerly, but the crop will be late. Market-garden crops are doing well, and bring good prices. Dairy products are about as formerly; good dairy cows bring good prices. Pasturage is in good condition. Fruit and berries promise well, but are somewhat backward.

Westford (J. W. Fletcher). — Corn is looking well, with about the usual acreage. Haying has not yet begun, but the prospect for the crop is good. Acreage of early potatoes about the same as usual,

and the crop is in good condition. There is an over-supply of milk at present, and dairy cows are high. Pasturage is in fair condition. Apples, blackberries, strawberries and raspberries promise well.

Townsend (Geo. A. Wilder). — No insects are doing damage. Indian corn is backward, with about the usual acreage. Haying has not begun, and there will be only a light crop. More early potatoes than usual were planted, but they were late in starting; now looking well. Early market-garden crops are about as usual in yield and price. There is no change in quantity and price of dairy products. Pasturage is in fair condition. Fruits and berries are very late, and suffered from frosts.

Dunstable (A. J. Gilson). — The currant worm is the only insect proving injurious at present. Indian corn is looking well, but is very small for this time of year; acreage smaller than usual. Haying has not begun, and the prospect is that the crop will be below the normal. Early potatoes are only raised for home use, and the prospect is that they will be late. Asparagus is the only early market-garden crop raised, and that has been light. The quantity of dairy products is about the same as in former years, with prices a little higher; dairy cows about the same as in former years. Pasturage is in fairly good condition for such dry weather. Berries of all kinds are very late, and promise only light crops.

Billerica (Geo. P. Greenwood). — Cut worms, wire worms, striped squash bugs, brown-tail moths and potato bugs are all doing damage. There is a small acreage of corn, and it is in poor condition. Haying has not begun, but the crop will be above the average with rain. There is about the usual acreage of potatoes, and they are looking well. The yield of early market-garden crops has been small, but prices have been good. The price of dairy products is about 10 per cent higher than usual. Pastures are in good condition. All berries are very backward.

Lincoln (C. S. Wheeler). — Gypsy moth caterpillars are doing some damage. Indian corn looks poorly, and some fields have just been replanted. A few fields of grass have been cut; crop about 90 per cent of a normal crop at present. Early potatoes promise fairly well. Early market-garden crops are below the average in yield, with prices good, and the prospect is good for later ones. Quantity and price of dairy products average; second-grade cows lower, good cows always in demand at good prices. Pasturage is above the average in condition. Strawberries suffered from late frosts, but promise a fair late crop.

Wakefield (Charles Talbot). — Potato bugs, striped squash bugs and gypsy moth caterpillars are doing damage. Very little Indian corn is planted in this section. Haying will commence in about a week, and the crop looks heavy. The acreage of early potatoes is fully as large as in former years, and the vines are looking finely. Market-garden

crops are a little late, but are bringing good prices. Dairy products are plenty, with prices a little higher than formerly; cows are high. Pasturage is in good condition. There are plenty of strawberries, and the outlook for apples, pears and cherries was never better.

Arlington (W. W. Rawson). — Haying has not yet begun, but the prospects for the crop are good. Early market-garden crops have given good yields and brought good prices. The greatest difficulty this season is in securing good help.

Weston (Henry L. Brown). — There is some complaint of cut worms, but insects have not done much harm as yet. Indian corn is not grown to any extent. There is a good prospect for the hay crop, but grass is late. Potatoes are much later than usual, as it took them a long time to come up, but they are looking well. There has been a poor yield of asparagus, and prices have been high; greens and rhubarb have sold well. Milk is higher than in former years, but so are grain and help; cows are also higher. Pasturage has been good, but now needs rain. Early strawberry blossoms were killed by frost, and they are very late; blackberries blossomed well where not winter-killed.

ESSEX COUNTY.

Salisbury (Wesley Pettengill). — Tent caterpillars, canker worms, cut worms and white grubs have appeared, but are not numerous. Corn is small and late, with the acreage a little smaller than usual. Haying has not begun, and the crop will be about medium, as rain is badly needed. The acreage of early potatoes is less than usual; crop looking fairly well, but backward. Early market-garden crops are not much raised; prices good. The quantity and price of dairy products is about the same as in former years. Pastures are good, but rain is needed on high ground. Strawberries and raspberries are looking well; no peaches or plums; pears few; apples set fairly well.

Haverhill (Eben Webster). — Tent caterpillars and striped cucumber beetles are doing damage. Indian corn is backward, with about a normal acreage. Haying has not begun, and the crop will be late. Cows are higher than in former years, and milk brings a higher price than last year. Pasturage is in good condition. Strawberries suffered from frost.

Rowley (D. H. O'Brien). — Tent caterpillars, flea beetles and potato bugs are doing damage. Owing to cold weather, some fields of corn were an entire failure, making the acreage less than usual, and that which came up looks poorly. Haying has not begun, and the prospect is for a medium crop. Acreage of early potatoes as usual, but prospects for the crop not promising. Owing to the late season, no market-garden crops have as yet been harvested, but they promise fair yields. Dairy products advanced in price, quantity normal; average supply of dairy

cows, prices slightly higher. Pastures are in very good condition. The outlook for strawberries and blueberries is good; apples medium; other fruits scarce.

Newbury (George W. Adams). — Little damage from insects as yet. Corn is looking fairly well, but is late; acreage perhaps 5 per cent below average. Haying has not begun, and the crop will be 75 or 80 per cent of a full crop. The acreage of early potatoes is decreased 10 per cent, but the crop promises fairly well, though late. Early market-garden crops are backward, but are in good condition and bringing normal prices. Quantity of dairy products excessive; price about the same as last year. Pasturage is in excellent condition. Strawberries fair; raspberries poor; peaches a failure; few pears.

Topsfield (B. P. Pike). — No insects are doing particular damage. Corn is hardly up as yet; little raised for grain. Haying has not yet begun, and the prospect is that there will be a good crop. The acreage of potatoes is decreased, and the crop is about a month late. No market-garden crops have been sold except spinach; peas will come in about July 4. Quantity of dairy products about as usual, and price a little better; dairy cows about as usual. Pasturage is in good condition. Strawberries are looking well; blackberries badly winter-killed; no peaches; plums scarce.

Danvers (C. H. Preston). — Gypsy moth caterpillars are doing some damage. Indian corn is fair, but backward, with an average acreage. Very little haying has been done, and a good crop is expected. There is an average acreage of early potatoes. Quantity of dairy products about as usual, and prices better than usual in some localities. Pastures are in good condition. The outlook is good for fruits and berries.

NORFOLK COUNTY.

Cohasset (Ellery C. Bates). — No insects are doing damage at present. Indian corn is not raised in this locality. Haying has just begun, with a good crop. The acreage of early potatoes is about normal, and a good crop is promised. Yield of early market-garden crops about normal; prices higher than usual; prospect for later crops good. Dairy products are about as usual in supply and price. Pasturage is in good condition. Apples, strawberries and raspberries promise well.

Randolph (Rufus A. Thayer). — Potato bugs are doing some damage. Corn is very backward, but there is about the usual amount planted. Grass is a good crop, but there has been very little cut as yet. Acreage of potatoes about as usual, but it is too early to estimate yield. Early market-garden crops are backward, but looking very well. Prices for dairy products higher than last year; cows plenty, at fair prices. Pastures are in excellent condition. Strawberries promise a fine crop.

Canton (Edwin V. Kinsley). — No insects are doing much damage.

Corn is very late; acreage about the same as usual, and four-fifths of it is grown for fodder. Haying has begun in a few instances, and the crop will be good. There are really no early potatoes; acreage average, but the crop does not promise well. Early market-garden crops are not grown here. Milk is in good supply, at prices in advance of former years; dairy cows high for good animals. Pasturage is very good so far. The outlook for fruit is rather below the average; strawberries are very late, just coming in.

Millis (E. F. Richardson). — Potato bugs are doing some damage. Indian corn is looking well, but is very late, and with a smaller acreage than usual. Haying has not begun, but there is a fair crop in sight. The acreage of early potatoes is much less than usual, and they are just commencing to grow. Yield and price of early market-garden crops above average, but they are very backward. Milk 26 cents per can at door, supply good; dairy cows high. Pastures are in fine condition. Strawberries and blackberries promise a large crop, judging from the bloom.

Franklin (C. M. Allen). — Insects are not doing much damage as yet. Many fields of corn had to be planted over, and there is probably a smaller acreage than usual. Haying has not begun, but there will be more than an average crop. There is the usual acreage of early potatoes, and they are looking finely. Early market-garden crops were a failure. Quantity of dairy products less than usual, and price does not correspond to cost of product. Pasturage is in very good condition. Strawberries, raspberries and blackberries are looking well.

Bellingham (John J. O'Sullivan). — Cut worms are doing some damage. Indian corn is looking fairly well, but is three weeks late. Haying has not begun, and there will probably be a good crop. The acreage of potatoes is about the same as usual, but the crop is not far enough advanced to tell as to condition. Yield of early market-garden crops poor, but prices better than usual. Quantity of dairy products same as usual; prices higher on both products and cows. Pastures are in good condition. Strawberries promise well; other berries little grown; prospect for fruit poor.

BRISTOL COUNTY.

Attleborough (Isaac Alger). — No insects have appeared, but they will probably come later. Corn is backward, but is improving fast; acreage about normal. No grass cut as yet, but the prospect for the crop is good. The acreage of early potatoes is about the same as usual, and they are growing finely. All market-garden crops are about ten days late. Prices for dairy products are a little higher than formerly. Pasturage is in good condition. Strawberries are looking well, but none have been picked for market.

Mansfield (Wm. C. Winter). — Currant worms, codling moths and

potato bugs are doing some damage, but none very much. Indian corn is very backward; not much grown, less this year than usual. Haying has not begun, but the crop is looking finely. Acreage of potatoes much less than usual, and the crop will be very late. No market-garden crops have been harvested as yet, except from glass. Prices for dairy products higher during winter months than usual; now normal. Pasturage is in good condition. Apples fair; pears one-third crop; plums very poor; no peaches; strawberries looking well; currants small crop; blackberries full bloom; raspberries fair bloom.

Seekonk (John W. Peck). — No insects have done damage as yet. Indian corn is in poor shape, as the weather conditions have been all against it; very little raised except for silage. No hay cut as yet, but prospect excellent if weather holds good for curing. Acreage of early potatoes about as usual, and crop looking finely. Early market-garden crops are excellent both in quantity and price. The supply of milk is falling off now, prices about the same; good cows bring high prices. Pastures are in excellent condition, but are beginning to need rain. Strawberries are about half a crop; blackberries and raspberries blossomed fairly.

Dighton (J. N. Paul). — We have not been troubled much as yet by insects. Corn is not looking well, much seed rotting in the ground and having to be planted over; acreage about as usual. Haying has not begun, and the crop will be light. Acreage of early potatoes about as usual, and crop late, but looking well. Yield of early market-garden crops below the normal, but prices good; later ones look well. Prices for dairy products are fully up to the average; dairy cows not plenty, and prices high. Pasturage is in good condition. Apples are looking well; no peaches, plums or pears. The strawberry crop is fully two weeks behind the normal; large quantity of fruit set, but rain needed to mature it.

Dartmouth (L. T. Davis). — There is very little damage as yet by insects. Corn is of good color, but very small for the time of year. Haying has not begun; prospect for a very good but late crop. The acreage of early potatoes is about as usual; prospects of the crop not definite as yet. Market-garden crops are backward, and little has been harvested. Dairy products are a little higher than usual, and dairy cows a good deal higher. Pasturage is quite a little below the average in condition. Strawberries blossomed quite thickly, but very few have ripened as yet; other berries much behind in bloom.

Acushnet (M. S. Douglas). — Potato bugs and asparagus beetles are doing some damage. Indian corn is not looking well; acreage less than half the usual amount, owing to cold weather. Haying has not begun, but a fair crop is promised. There is about the usual acreage of early potatoes, and they promise well. The yield of early market-garden crops has been fair, and prices above the average, with good prospects for later ones. Milk and butter are higher in price than formerly, also dairy cows. Pastures are in good condition. There

is a large crop of strawberries and raspberries. Peas are fifteen days late in being marketed. On the 13th, 14th and 15th of June hard frosts injured beans, tomatoes and potatoes.

PLYMOUTH COUNTY.

Norwell (H. A. Turner). — Very few insects are troubling us. Indian corn is late and small, with about the usual acreage. Haying has hardly begun, but the prospect is for a good crop. Potatoes are looking finely, and promise a normal crop. Market-garden crops are late, and it is difficult to say how they will turn out. The quantity and price of dairy products are about the same as usual. Pasturage is in good condition, but rain is needed. The outlook is good for berries, particularly strawberries.

West Bridgewater (Clinton P. Howard). — Canker worms are doing the most damage of any insect, but none are very destructive. Corn came up badly, and much of it will have to be planted over. Haying is about to begin, and the crop is the best for many years. Potatoes are looking well, with about the usual acreage. All vegetables are very late, and those planted early are poor yields. Prices for dairy products are a very little higher than last year. Feed in pastures could not be better than at present. All fruit trees blossomed full, and now promise large yields; strawberries will be plenty about July 1.

Pembroke (Nathaniel Morton). — No insects are doing any damage. Acreage of Indian corn very small, and crop in poor condition. Haying is just commencing in this locality, with a good crop. Acreage of early potatoes about as usual, and they promise fairly well. There are no early market-garden crops, and the prospect is not good for later ones. The quantity and price of dairy products is less than in former years. Pasturage is in good condition. Strawberries promise a fair crop.

Kingston (George L. Churchill). — Potato bugs are doing some damage. Indian corn is very backward, and not much has been planted. Haying has not yet begun, but there will be a fair crop of hay. The acreage of early potatoes is about the same as last year, and they now promise fairly well. The yield of early market-garden crops is very fair, with prices about as usual. Quantity and price of dairy products about as in former years. Pasturage is in very good condition. There is a fair prospect for fruits and berries.

Bridgewater (Rowland Cass). — Potato bugs and cut worms are doing some damage. Indian corn is late, with about the usual acreage. Haying has commenced, with a fair prospect for the crop. There is a reduced acreage of early potatoes, and they are very backward. Market-garden crops are good average crops, with the prospect good for those not yet harvested. Dairy products are a good average both in quantity and price. Pasturage is in good condition.

Rochester (Geo. H. Randall). — Cut worms and currant worms are

doing a limited amount of damage. Corn is small, but growing fast; acreage about as usual. Haying has not begun, but there is promise of an average crop. Early potatoes are a little late, but coming forward rapidly; acreage fully up to last year. Early market-garden crops compare favorably with former years in yield and price. There is a full supply of milk, with little demand for cows; prices have been well sustained. Pasturage is at its best. There will be few currants; gooseberries good; strawberries and raspberries good, with showers soon.

Mattapoisett (E. C. Stetson). — Currant worms, tent caterpillars and fire worms are doing some damage. Indian corn is very late, many fields just coming up and others just planted; acreage about as usual. Haying has not begun, but there is a good crop in prospect. There is about the usual acreage of early potatoes, which are late, but growing very rapidly. Milk is a little higher than formerly, and cows bring about the same prices as formerly. Pastures are in good condition. Strawberries and currants are late, but looking well.

BARNSTABLE COUNTY.

Falmouth (Daniel R. Wicks). — Currant worms and cucumber beetles have appeared. Corn is late, and just beginning to grow; acreage about normal. No haying has been done, but there is a big crop to be harvested. Potatoes are looking finely, and promise a good crop, but are late, like all vegetation. No early market-garden crops harvested as yet; peas just beginning to show bloom. Prices for dairy products same as in former years. Pasturage is in good condition. Fruits are very late, but promise fairly well; currants heavy crop; no strawberries; early peaches show leaf-curl badly; Japanese plums a failure.

Mashpee (W. F. Hammond). — Indian corn is looking well, but with acreage below the average. Haying has just begun, and the crop will be above the average. Early potatoes are looking quite well, but there will not be an average crop. Market-garden crops are below the average, but prices are above. Dairy products and dairy cows are bringing about the usual prices. Pasturage is above the average in condition. Apples, pears and plums half crops; berries about average.

Dennis (Joshua Crowell). — Cranberry vine worms are doing some damage. Corn is very backward; acreage about as last year, perhaps slightly increased. Haying is just beginning, with fair prospect, but rain is needed. Acreage of early potatoes about the same as usual, and they promise fairly well. Market-garden crops are very late, but will probably be about average if rain comes soon. Quantity of dairy products about as usual; prices a little higher. Pastures are in fair condition. Too early to form an opinion as to prospect for cranberries; strawberries good; other berries fair; apples set fairly well.

Brewster (Thomas D. Sears). — Tent caterpillars and cranberry vine worms are doing damage. Indian corn is looking well, though backward; acreage about as in previous years. Haying has not begun, and there will be about an average crop. The acreage of early potatoes compares favorably with previous years, and promises a good crop. Not much market-gardening is done here. The quantity and price of dairy products and dairy cows compares favorably with former years. The condition of pasturage is rather above the average. The season being very backward, it is hard to tell the outlook for fruit and berries.

Chatham (E. Z. Ryder). — Cut worms are very plenty this season. Corn is very backward, with the acreage about as in former years. Haying has begun, with an average crop. Early potatoes look well, with about the usual acreage. Market-garden crops are backward; none harvested as yet, with prospect of advanced prices. Quantity and price of dairy products same as in former years. Pastures are drying up on account of lack of rain. Strawberries will be a small crop; raspberries look well, also blackberries; currants have set well; cranberries show full bloom.

Eastham (J. A. Clark). — No insects are doing any unusual amount of damage. Indian corn is hardly up as yet. Haying has not begun, but the prospect for the crop is good. There is the usual acreage of early potatoes, and they are looking well, though backward. No market-garden crops have been harvested except asparagus. The quantity and price of dairy products are about as usual. Pastures are in good condition, but need rain. Strawberries need rain badly. Asparagus started late, and was not up to last season in yield; price if anything a little less.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — Tent caterpillars are doing some damage. Indian corn is backward; acreage not far from average. Haying has not begun, but the prospect for the crop is good. There is the usual acreage of early potatoes, and they are in good condition. Early market-garden crops have given average yields and prices. Dairy products bring a little higher prices than formerly; cows scarce and high. Pastures are in very good condition. Strawberries promise well.

NANTUCKET COUNTY.

Nantucket (H. G. Worth). — Cut worms and potato bugs are doing damage. Indian corn is at least two weeks late, with about the usual acreage. Haying has not begun, but there is prospect of a good crop. Potatoes are looking well, with the acreage fully up to former years. All garden crops are late, but with good prospects and good prices. Dairy products have advanced in price, with good cows selling well. Pasturage is in good condition. Strawberries promise well.

BULLETIN OF

MASSACHUSETTS BOARD OF AGRICULTURE.

PLUM CULTURE IN MASSACHUSETTS.

By Prof. F. A. WAUGH, *Professor of Horticulture, Massachusetts Agricultural College.*

Next to the peach, the plum is the most important stone fruit grown anywhere in the temperate regions. In many localities it is even more important than the peach. This observation holds true in Massachusetts, for while in some sections the peach is a valuable fruit and even an important commercial crop, there are other sections where it cannot be grown. Plums of some sort can be grown, however, in every town in the State.

This much wider adaptability of the plum is due to two causes: first, there are many different varieties, derived from very different species, some of which thrive on one soil and some on another, so that plums may be selected for every kind of tillable soil; second, these different species vary a great deal as regards hardiness. While some of them are more tender than peaches, others are even hardier than apples, so that they may be grown in cold districts and exposed situations. In spite of all its good points, the plum is sadly neglected; in fact, it is a rarity to find an adequate supply of good plums on any farm in Massachusetts. There are a few trees on almost every farm, but the sad fact is that a majority of them are mere breeding places for black-knot; only a few ever bear fine, sound, clean fruit.

Yet the plum is one of the most luscious fruits when properly grown and well ripened on the tree. For eating out of hand it is surpassed by the peach alone; as a dessert fruit it has no superior; while for canning it easily ranks next to peach, and for jelly making competes for first place with the red currant.

Unfortunately, the general impression has grown up that the plum is a difficult fruit to grow. In a certain sense this is so; but when looked at fairly, the plum is found to be as easily managed as any other crop. The difficulty is that men have considered it to be of secondary importance, and therefore have not given the same careful attention to it that they have to what they consider more important

crops. The plum is really no more difficult to grow than corn, tobacco or strawberries. There are a few principles which have to be understood, and a few details which have to be carefully attended to; but these requirements have to be met with every crop, in order to make it a success.

Soils.

It has already been suggested above that the plum may be grown on a variety of soils; indeed, plums of some sort may be grown on any soil which will produce any kind of agricultural crop. The Japanese varieties, though shortlived on sand, will thrive for a few years and give excellent crops on even the lightest soils. The old-fashioned Domestica varieties will do well on heavy clay. Some varieties will even do well on wet land, though for other reasons it is not practicable to plant plum orchards in swamp ground. It should be observed that on heavy clay soils the old-fashioned European plums and Damsons should be planted in preference to other varieties. On good gravelly apple soils almost all kinds of plums can be grown with success. On light sandy soils the Japanese varieties should be preferred; and they may be further adapted to these conditions by propagating them on peach roots.

This matter of propagation is very important in securing the greatest success with plums, but not much can be said or done about it until the nurserymen are in a position to supply plum trees propagated on various kinds of roots.

Starting the Plantation.

In buying Japanese plum trees from the nursery, one-year-old trees should always be selected; two-year-old trees are much harder to manage. On the other hand, in buying European plums or Damsons, two-year-old trees are to be preferred. This difference is quite important in both cases.

In preparing plum trees for planting, it is the best practice to cut them back rather severely. All long, straggling roots may be removed, being cut back within six or eight inches of the main stem. All side branches should be cut off from the top, and the main stem shortened in to a length not exceeding two feet. In many cases trees may be headed still lower to advantage. Trees closely pruned in this manner are easier to handle and to plant, and they make a better growth the first year and form more symmetrical heads.

In setting a block of plum trees, they may be placed from 10 to 15 feet apart each way. A distance of 10 by 10 feet is enough for smaller-growing varieties, like Damsons and Italian Prune, especially if they are to be kept closely headed in. A distance of 15 by 15 feet each way may be required of vigorous-growing varieties on strong land. The popular Japanese variety Burbank, which inclines to spread horizontally, requires as much space as any. If this variety is properly

shortened in each year, it may be comfortably grown, cultivated and sprayed where planted 15 feet apart each way.

Where no highly developed system of management is attempted, the plum tree may be pruned essentially the same as the apple tree. This refers to ordinary farm methods. The center of the tree is kept reasonably well opened, in order to let in light and air; broken branches are cut out as required, and wounds are painted over. This sort of pruning is usually done early in the spring, — the earlier the better; the latter half of March is usually the most convenient time. As a rule, it may be considered better to do this sort of pruning during the month of June; and the transfer of the pruning season from March to midsummer is to be recommended under most circumstances.

Where plums are extensively cultivated for market, so that more critical care is given to them, a more exact system of pruning is to be recommended. Many plum growers adopt the system of heading in their trees annually. This heading in is practised especially at the top of the tree, where strong growth is apt to be made. Most varieties of plums will thrive better under a system of severe cutting back than apple trees will. Under such a system of pruning, branches of a considerable size have to be removed from the interior of the tree from time to time, in order to prevent choking the head. In all these operations it may be borne in mind that the plum tree is naturally shorter lived than the apple (especially the Japanese plum), and the fruit grower is giving himself unnecessary worry when he endeavors to transmit his plum orchard unimpaired to his grandchildren.

Cultivation.

Plum trees require cultivation. Of course they live for a while when growing in grass, but it is very seldom that they will produce even reasonably good crops under such treatment. The system of cultivation to be followed is that now commonly practised by successful apple growers. It consists in plowing the soil early in the spring, or cutting it up with a spading harrow, following this with frequent surface cultivations, using such tools as the spring-tooth harrow, Acme or smoothing harrow, ceasing cultivation about July 1, and planting some sort of cover crop. The cover crop may be omitted in some cases, but is worth time, on account of the fertility which it adds to the soil.

A substitute for cultivation of plum trees which is often advised and used is to plant the trees in a poultry yard. This is recommended on the theory that the poultry will eat up the curculios; but the real advantages come in the partial cultivation of the soil by the scratching poultry, in the elimination of weeds, and in the supply of plant food from the poultry droppings. Certainly plum trees are about the best things that can be found for growing in the poultry yard.

Fertilization.

The plum bears heavily under reasonably favorable circumstances, and these heavy crops are a serious drain on the vitality of the tree. This fact naturally suggests that the tree should have liberal fertilization. Chemical analysis shows that the plum pits contain unusually large quantities of potash, which ought to be replaced in suitable manures. It is hardly practicable to give a special formula for fertilizing plum trees; they have practically the same requirement as peach trees. As a rule it may be said that lime and potash are especially required, and that one must use his own judgment in the supply of nitrogen, basing that judgment on the color of the foliage and the general vigor of the tree. Dr. Van Slyke recommends the following formula: —

	Pounds.
Nitrate of soda,	25
Dried blood,	60
Acid phosphate,	250
Muriate of potash,	90

This fertilizer has the following composition: nitrogen, 2.4 per cent, total phosphoric acid, 9 per cent; potash, 10.5 per cent.

Barnyard manure well rotted can of course be used on plum trees in small quantities, though it is certain to have an excess of nitrogen and to be weak in potash.

Varieties.

There are a great many different kinds of plums on the market, and the problem of selecting those which are best suited to particular soils and special requirements is a rather difficult one. Much of the failure which we see is due to the selection of unsuitable varieties, and many men are discouraged by such results.

The old-fashioned garden plums, which came to our country from Europe, are probably the best known; and where they can be successfully grown they are the most desirable. There are some drawbacks with these varieties, even under the best conditions. For instance, they are slow about coming into bearing, and they are very susceptible to the attacks of black-knot. Those varieties of this class which are most generally successful in Massachusetts are Bradshaw, Lombard, Italian Prune, Englebert, Quackenboss and Grand Duke. There are some other favorite varieties, which, though more difficult to grow, should not be forgotten. Probably the Green Gage stands first amongst these, though in most cases Bavay (Reine Claude) is to be preferred to the genuine Green Gage, it being a later, larger and better edition of the same variety. Another fine old-fashioned plum which is comparatively difficult to grow is the Yellow Egg or Magnum Bonum. Coe's Golden Drop falls into this same category. The different kinds of Damsons have somewhat the same characters

as the European garden plums just mentioned, though the trees are rather smaller and usually come into bearing earlier. The Damson plums find a very ready market in New England cities, and where they can be well grown are amongst the most profitable of all.

The Japanese plums have played an almost revolutionary role in this branch of fruit growing; they now undoubtedly form a majority of all the plum trees growing in the State. Of these, the Burbank is the most widely useful. It seems to succeed everywhere, and is a satisfactory plum for both home use and market. Satsuma, much prized for canning, succeeds admirably in some places and fails utterly in others. It is not so hardy as Burbank. Red June, though of poor quality, is early and prolific. These two qualities make it a successful variety, and one of the most profitable for market. Abundance has the best quality of any of the Japanese plums commonly grown, and by many is regarded as the most satisfactory one for garden culture. The tree is short lived, however, and subject to disease, so that the variety could not be recommended for market gardening. Chabot is one of the best late-ripening varieties.

There are several hybrid plums of more or less consequence, — chiefly less. The one most widely planted is Wickson. In some places this has given promise of being a useful commercial variety, but on the whole it cannot be recommended. Other varieties of partial American parentage, such as Gold, Waugh, Gonzales, etc., have been tested to some extent, but do not appear to be well adapted to conditions in Massachusetts.

Pollination.

One striking quality of the plum tree is its demand for cross-pollination. There are very few varieties which will bear fruit of themselves; nearly all require to have their blossoms fertilized by pollen from other trees. This tendency is so striking in most varieties that they will bear no fruit at all without cross-pollination, and practically all varieties bear more fruit and of better quality when properly cross-pollinized. In order to secure this cross-fertilization, it is necessary to have two or more varieties growing near each other. Where the trees are planted in gardens, it is best to have these different varieties in alternating rows. Where large blocks are being planted for commercial orchards, not more than three or four rows of a single variety should be placed together. It is important to observe that varieties which are placed together for purposes of cross-pollination should blossom at the same time.

Diseases.

The black-knot has long been the bugaboo of the farmer or householder who wishes to grow a few plums. Neglected trees are frequently, or even usually, killed by this disease, and many persons suppose it to be necessarily fatal to all kinds of plums. This is far

from the truth, however. Japanese plums are much less severely attacked by black-knot than the ordinary varieties, but they are not immune. Plum trees, even of the most susceptible varieties, which receive good care will rarely suffer from black-knot. Spraying will do something to check the disease, but the pruning knife will do more. Every black-knot should be cut out and burned as soon as it is seen. If a general pruning is given the trees in June, most of the black-knot will be discovered in its earliest stages; then is the best time for its removal. The fruit grower should go through the plantation again during the period when the leaves are off, when any fully developed knots are more plainly visible; these should then be removed and burned. If this practice is kept up year after year, there will be no difficulty whatever.

Another disease which is very embarrassing to the plum grower at times is the brown rot or ripe rot, most conspicuously seen on the fruit just at ripening time. This often ruins a large proportion of the crop. It is caused by a fungus which grows in the twigs and fruit throughout the summer season, but which manifests itself most conspicuously on the fruit at ripening time. Considerable check will be given to this disease also by properly spraying with Bordeaux mixture. Careful hand-thinning of the fruit will do more toward checking the disease. Many varieties of plums, especially the Japanese, may be picked some days before they are dead ripe, and this offers another means of getting ahead of the brown rot.

Insects.

As the black-knot is considered to be a universal and fatal disease, so the curculio is commonly considered to be an insect ruinous to the plum grower's interest. It is true, of course, that in many cases a large part of the crop is injured by this insect, and sometimes practically the entire crop is damaged. This seldom or never occurs, however, in large blocks of plum trees, or on trees which are cultivated or grown in poultry yards. In fact, in our experience the curculio is a distinct blessing. The fruits are usually punctured early in the season, when they are about the size of peas. Punctured fruits commonly fall off early in the season, and the curculio thus becomes an efficient assistant in thinning the fruit. This practice of thinning out the fruit on plum trees is very important, and should be attended to every year about the last of June. After the curculio has taken off from 10 to 80 per cent of the crop, it is usually necessary to pick another large amount by hand; the curculio thus saves much expensive hand labor. It is not the purpose of this article to praise the curculio, nor to recommend its adoption as a universal field assistant in plum growing, but simply to point out that it is not a serious menace to the business.

The San José scale is by all means the most important insect which

we have to deal with in plum growing. It is very fond of plum trees, especially those of the Japanese varieties. On these it multiplies rapidly, and trees once attacked are very soon ruined. Extensive experiments made at the Massachusetts Agricultural College and elsewhere show that this insect may be held in check by proper applications of lime-sulphur spray. Experience generally indicates that this is the best treatment.

Spraying.

Plum trees need some spraying, usually on about the same lines as the work given to the apple orchard. Spraying should be given annually, usually two to four times each year, and in all cases must be thorough to be worth while. Careless spraying is a waste of time and material. When the San José scale is to be treated, the lime-sulphur spray will be given early in the spring. A heavy spraying of Bordeaux mixture or of plain blue vitriol solution before the buds open will aid in checking brown rot and other diseases. Another spraying of Bordeaux mixture, with arsenical poison added, should be given soon after the blossoms fall. It should be specially noted in this connection that Bordeaux mixture should be only half strength for plum trees. Some varieties, especially those of the Japanese group, have the foliage seriously injured by strong Bordeaux. Perhaps the best formula for this work is as follows: —

Fresh unslacked lime,	3 pounds.
Copper sulphate,	2 pounds.
Water,	50 gallons.

The mixture is then made up in the usual way, and applied with a nozzle throwing a fine, misty spray.

Marketing.

A considerable sale can be found for plums in all the markets in Massachusetts where they are properly handled. Very early varieties and late varieties are found to be the most profitable. For local markets, where the fruit is sold from fruit stands, the common quart berry box is a convenient package. Sometimes the small five-pound grape basket with stiff bale seems to please customers. In selling the bulk of the crop to local customers for canning purposes, the sixteen-quart Jersey peach basket is one of the most satisfactory of all. The eight-quart (one peck) basket pleases a good many customers who do not care to buy plums by the half bushel. Where good plums are to be shipped a considerable distance, the six-basket Georgia peach carrier is found very satisfactory.

SERIES OF 1907. VOL. 20. NO. 3.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF JULY, 1907.

HATCHING AND REARING CHICKS.

ISSUED MONTHLY, MAY TO OCTOBER, BY STATE BOARD OF AGRICULTURE, STATE HOUSE, BOSTON, MASS.

J. LEWIS ELLSWORTH, *Secretary.*

ENTERED JUNE 3, 1904, AT BOSTON, MASS., AS SECOND-CLASS MATTER, UNDER ACT OF CONGRESS OF JUNE 6, 1900.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1907.

Approved by

The State Board of Publication.

Crop Report for the Month of July, 1907.

Office of State Board of Agriculture,
Boston, Mass., Aug. 1, 1907.

Bulletin No. 3, Crop Report for the month of July, is presented herewith. Attention is called to the article on "Hatching and Rearing Chicks by Natural Methods on the Farm," at the close of the bulletin, by John H. Robinson, editor of "Farm Poultry." The literature dealing with the incubation and rearing of chicks is in the main devoted to the artificial methods, so that an article on natural methods, giving full directions as to the best and easiest courses to pursue, will doubtless be of interest and value to the great number of poultry raisers who produce from one to two hundred chicks each season. Natural methods are still practised and generally found superior on most of our farms. Mr. Robinson has had a great deal of experience with these matters, and his article is an extremely valuable one.

Progress of the Season.

The Crop Reporting Board of the Bureau of Statistics of the Department of Agriculture (Crop Reporter for July, 1907) finds that the preliminary returns show the acreage of corn planted to be about 98,099,000, an increase of about 1,361,000 acres, or 1.4 per cent, as compared with the final estimate of the acreage planted last year. The average condition of the growing crop July 1 was 80.2, as compared with 87.5 on July 1, 1906, 82.7 in 1905, and a ten-year average of 85.9.

The average condition of winter wheat July 1 was 78.3, as compared with 77.4 a month earlier, 85.6 on July 1, 1906, 82.7 in 1905, and a ten-year average of 80.4. The average condition of spring wheat July 1 was 87.2, as compared with 88.7 a month earlier, 91.4 on July 1, 1906, 91 in 1905, and a ten-year average of 88. The average condition on July 1

of spring and winter wheat combined was 81.6, as compared with 87.8 on July 1, 1906, and 85.8 on July 1, 1905. The amount of wheat remaining in the hands of farmers on July 1 was estimated at about 54,853,000 bushels, equivalent to about 7.5 per cent of the crop of last year.

The average condition of the oat crop July 1 was 81, as compared with 81.6 a month earlier, 84 on July 1, 1906, 92.1 in 1905, and a ten-year average of 88.2.

The average condition of barley on July 1 was 84.4, against 84.9 a month earlier, 92.5 on July 1, 1906, 91.5 in 1905, and a ten-year average of 88.7.

The average condition of winter rye on July 1 was 89.7, as compared with 91.3 on July 1, 1906, 92.7 in 1905, and a ten-year average of 90.9.

The acreage of potatoes, excluding sweet potatoes, is more than that of last year by about 54,000 acres, or about 1.8 per cent. The average condition on July 1 was 90.2, as compared with 91.5 on July 1, 1906, 91.2 in 1905, and a ten-year average of 91.3.

The acreage of tobacco is less than that of last year by about 34,000 acres, or 5.6 per cent. The average condition on July 1 was 81.3, against 86.7 on July 1, 1906, and 87.4 in 1905.

The average condition of cotton on June 25 was 72, as compared with 70.5 on May 25, 1907, 83.3 in 1906, 77 in 1905, and a ten-year average of 83.2.

In Massachusetts the acreage of corn as compared with last year is 98, and the condition July 1 was 83; the average condition of oats was 95; the average condition of rye was 92; the acreage of tobacco, 100, and the average condition, 87; the average condition of pasture, 98; the average condition of clover, 92; the average condition of alfalfa, 100; the average condition of timothy, 92; the acreage of potatoes, 100, and the average condition, 85; the average condition of Canadian peas, 85; the average condition of beans, 90; the average condition of cabbages, 87; the average condition of onions, 90; the average condition of tomatoes, 83; the average condition of apples, 80; the average condition of peaches, 45; the average condition of grapes, 85; the aver-

age condition of blackberries, 85; the average condition of raspberries, 80; the average condition of strawberries, 88; the average condition of cantaloupes, 85; the average condition of watermelons, 82.

Temperature and Rainfall for the Whole Country.

[From United States National Weekly Weather Bulletin.]

Week ending July 1. — The mean temperature of the week was considerably above the normal in central and western Texas, on the southern California coast and in portions of Oregon and Washington. It was slightly above normal in southern New Mexico, on the central Gulf coast and in portions of the Lake region and southern New England. Elsewhere the mean temperature was below the normal, the deficiency ranging from 3° to 6° from the middle Plateau region eastward to the upper Ohio valley. The rainfall was considerably above the normal in the Atlantic coast districts, interior of the east Gulf States, western Tennessee, Arkansas, northern Louisiana, Oklahoma and Kansas, and in portions of the lower Missouri and central Mississippi valleys and the Lake region. There was less than the usual rainfall in most of the Ohio valley and Lake region.

Week ending July 8. — The mean temperature was below the normal in the Lake region and upper Ohio valley, generally throughout the Atlantic coast and east Gulf districts. For the most part the deficiencies were less than 3° per day, ranging from 3° to 6° in the Lake region. The mean temperature was nearly normal in the lower Mississippi valley and above normal in the Missouri and upper Mississippi valleys. For the most part the week was dry. Extensive areas in the central valleys received no measurable amount of rain, and only light showers occurred in the Middle Atlantic States and lower Lake region and over a large part of the central Gulf districts. The rainfall was considerably above normal in Florida, portions of the east Gulf districts and south-central Texas. Heavy rains also occurred over portions of the central Missouri and upper Mississippi valleys.

Week ending July 15. — Typical midsummer temperatures prevailed on the Pacific coast and over most of the

country east of the Rocky Mountains, the departures from the normal being unimportant. The week was somewhat cooler than usual in the upper Missouri valley, middle and northern Rocky Mountain districts, central Plateau region, the eastern portion of the lower Lake region and the interior of northern New England where the temperature deficiency ranged from 3° to 6° per day. Very heavy rains fell in the Ohio, upper Mississippi and Missouri valleys, on the South Atlantic coast and in central and northern Texas, and there was more than the average over the greater part of the Lake region and in portions of New England and the central and east Gulf States. The weekly precipitation was less than the normal over the northern portion of the upper Lake region, in the immediate coast districts from southern New England to Virginia, in southern Florida and over a considerable part of the Gulf States.

Week ending July 22. — The mean temperature was above the normal over the central portion of the middle Rocky Mountain slope, in the lower Missouri valley and in the districts eastward of the Mississippi River, except on the Middle Atlantic coast, where it was nearly normal. The excess was generally about 3° per day. The mean temperature was below the normal over the interior of California, on the north Pacific coast, in the Plateau and Rocky Mountain regions and upper Missouri valley and over the greater part of Texas. The rainfall was excessively heavy in the central Missouri and upper Mississippi valleys, over the southern portion of the upper Lake region and in portions of the upper Ohio valley and Middle Atlantic States. The western portion of the lower Lake region and the interior portions of the Middle Atlantic States and New England received from 1 inch to more than 2 inches. Generally throughout the southern States the rainfall was much below the average.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending July 1. — New England. Boston: The mean temperature was seasonable, the maximum being near 90° the first of the week. The precipitation was above the nor-

mal. Local showers and thunderstorms occurred during the first three days, and were accompanied in places by hail and high winds. Copious rains were general during the night of the 29th. The sunshine was about the average.

Week ending July 8. — New England. Boston: The sunshine and mean temperature were nearly normal. The precipitation was light and scattered in Massachusetts, Rhode Island and Connecticut, and copious in Vermont, New Hampshire and the greater portion of Maine. Severe thunderstorms, with heavy rain and hail, occurred in New Hampshire and Maine on the 7th.

Week ending July 15. — New England. Boston: The maximum, minimum and mean temperatures were near the normal. The precipitation was deficient in Rhode Island and southeastern Massachusetts; elsewhere it was copious, from 1 to 2 inches falling in New Hampshire and central Massachusetts on the 12th. The sunshine was about the average.

Week ending July 22. — New England. Boston: The mean temperature and sunshine were above the normal. The rainfall accompanied local thunderstorms and was unevenly distributed. The weekly rainfall was near the normal over most of New Hampshire, Vermont and the western parts of Massachusetts and Connecticut; it was deficient elsewhere. Southeastern Massachusetts is suffering from drought.

The Weather of July, 1907.

The seasonal weather that began in the second decade of June and continued through the remainder of that month obtained throughout July. The weather of the month was characterized by abundant sunshine in nearly all sections. There were no protracted atmospheric disturbances, and the rainfall of the month, which was very unevenly distributed, resulted from local storms, and as a rule the showers occurred in the afternoon or at night. In a number of instances the storms were accompanied by high winds, and lightning and thunder, that caused much damage to buildings and crops, and some loss of life. The temperatures were uniformly high through the entire month. While there

were no excessively high temperatures, no record breakers, the daily mean temperatures were, with a few exceptions, above the seasonal averages. The monthly means were from 1° to 1½° above the July normal. The night temperatures were as high as the average. The wind movement was below the average, and the per cent of humidity generally high, and these conditions, combined with the uniformly high temperatures, caused the weather to be quite oppressive during a large portion of the month. The season, which was estimated from a week to a fortnight late at the close of June, was generally considered to be about normal at the close of July. Generally speaking, the weather of the month was very pleasant, and ideal for the mid-summer season.

In the circular to correspondents, returnable July 23, the following questions were asked: —

1. What insects are proving most troublesome in your locality?

2. What is the condition of Indian corn, and what proportion of the crop will be put into the silo?

3. What is the quantity and quality of the hay crop as compared with former years?

4. What forage crops are raised to supplement the hay crop, for the silo, and to eke out the pastures, and what is their condition?

5. What is the condition of market-garden crops, including potatoes, and how have those already harvested compared in yield and price with former years?

6. What is the prospect for apples, pears, peaches, plums, quinces, grapes and cranberries?

7. What is the condition of pasturage in your locality?

8. How have rye, oats and barley compared with former years, both as grain and forage crops?

Returns were received from 148 correspondents, and from them the following summary has been made up: —

Insects.

Insects appear to be less numerous and troublesome than usual. The potato bug is the one most commonly mentioned, but is not reported in the usual numbers. The elm-leaf

beetle is doing considerable damage to elm trees in widely scattered sections. Reports of damage from gypsy moth caterpillars come in from an increased area and in increased numbers. Other insects reported as doing damage are rose bugs, squash bugs, currant worms, tent caterpillars, curculios, cabbage worms, spittle insects, cut worms, wire worms and cranberry vine worms.

Indian Corn.

At the time of making return Indian corn was reported as growing very rapidly, under the stimulus of the warm weather and the frequent showers reported from most sections. It was still considerably later than the normal, however, and unless frosts hold off unusually late, or the crop makes an unexpectedly quick growth during August, the prospects for the yield of grain are not of the best. For the silo and as stover it will undoubtedly be as valuable as in the ordinary year. Silos increase in favor in the dairy sections, where the greater part of the corn crop is used in this way, but elsewhere only a small proportion of the cut goes into the silo.

The Hay Crop.

Haying was not entirely completed at the time of making returns, as it was late in starting, owing to the backward spring, and there has also been great difficulty in securing help to work. The crop is generally reported to be considerably above the average, many saying that it is the heaviest crop ever secured in their sections. Starting slowly, it developed very rapidly with the advent of warm weather, and the timely rains and showers of June and early July brought it to the high point attained in yield. The quality is reported as excellent, with no unusual amount of damage from rain, in spite of the somewhat "catching" weather. On early cut fields the rowen crop promises well, but so much remains to be done, or was but recently cut, that it is impossible to judge of the prospects of the second crop as a whole.

Forage Crops.

The acreage of forage crops remains about the same as usual, with a slight falling off where there is any variation, owing to the excellent prospects of the hay crop. Corn is the most popular crop for this purpose, with the millets and oats following, in second and third places, and Hungarian grass and barley coming closely together after them, in the order named. Oats and peas, sown together, are raised to a considerable extent for soiling purposes. Other forage crops are Canadian peas, rye, sorghum, roots and alfalfa. All are in good condition, though a little late.

Market-garden Crops.

Market-garden crops are all somewhat late in coming into the market, but are reported as yielding well, and bringing about average prices. Those still to be harvested are reported as doing well, except in southeastern Massachusetts, where they are pinched by the dry weather which has prevailed in that section.

Potatoes.

Potatoes are late, very few early potatoes having been put upon the market. Some fields are ragged and not very promising, owing to failure to germinate. Vines are otherwise reported as looking well and promising a good crop. In southeastern Massachusetts this crop is also in need of rain.

Fruits.

Apples will be a light crop in almost all sections. They bloomed fairly well, but did not set in accordance with the bloom, and have dropped very badly as the season progressed. Usually such a condition is progressive and later reports will probably be even more discouraging. Pears and plums also will be light crops. There will be practically no peaches at all, owing to winterkilling of trees and late frosts. Quinces generally promise well, but are not much grown. Grapes have set well and promise well at present. Cranberries bloomed very full, but are rather backward at present.

Pasturage.

In southeastern sections the pastures are reported as dry and brown, no rain of any amount having fallen in some localities since early in June. Elsewhere the frequent showers have kept them green and growing, with excellent feed, and as a whole the condition has seldom been better at the close of July.

Small Grains.

Rye, oats and barley are all reported as about normal crops, where grown, though there are a few complaints of poor yield of oats. They are mainly grown for forage, especially the two latter, and in that capacity also promise well.

NOTES OF CORRESPONDENTS.

(Returned to us July 23.)

BERKSHIRE COUNTY.

Mount Washington (H. M. Weaver). — Potato bugs are doing some damage. Corn promises well if we do not have early frosts; about one-third of the crop will be put into the silo. The quantity and quality of the hay crop is above the average. Forage crops are little raised. Potatoes have not been dug, but promise well. Apples, pears and plums will give average yields. Pasturage is in very good condition. Rye, oats and barley are below the average.

Alford (Lester T. Osborne). — Insects are doing but little damage, and the potato bug is less troublesome than usual. Indian corn is rather late, but better than expected; one-fourth the crop goes into the silo. The hay crop is equal to last year and above the average, the growth for the past three weeks being remarkable. Corn is the only forage crop raised. Apples promise a full average crop. Pasturage is the best ever known, the conditions for its growth having been perfect. The prospect is that there will be average yields of rye, oats and barley.

West Stockbridge (J. S. Moore). — Currant worms and potato bugs are doing some damage. Indian corn is at least three weeks late; none raised for the silo. Hay is a light crop on uplands, but good on meadows. Haying has begun, but farmers are handicapped by lack of help. No forage crops are raised. Market-garden crops are looking well, but are late; no potatoes dug as yet. The prospect is poor for all kinds of fruit. Pastures are in good condition. Rye, oats and barley promise about average crops.

Becket (Wm. H. Snow). — Potato bugs are doing some damage. Corn is very late, but is growing fast; three-fourths of the crop is raised for ensilage. Corn and oats are the principal forage crops grown. Market-garden crops are fully average in price and quantity. The prospect for fruits is not good. Pasturage is in very good condition. Rye, oats and barley are late, but have made a big growth.

Washington (E. H. Eames). — Indian corn is improving and promises to be a fair crop; none raised for ensilage. Forage crops are not grown in this locality. Market-garden crops are not grown here. The prospect is good for apples and pears. Pasturage is fully up to

the average in condition. Oats are a good crop; rye and barley not raised.

Hinsdale (Thos. F. Barker). — Potato bugs are doing some damage. Corn is backward but growing well; no more than usual will be put into the silo. The hay crop is above the average in quantity and quality. Oats are the principal forage crop grown, with some millet. Market-garden crops are very late, with prices high; no potatoes harvested. There will be a great crop of apples, but only a light yield of small fruits. Pasturage is in good condition. Rye, oats and barley have all made good growths.

Hancock (B. H. Goodrich). — Potato bugs are doing some damage. Corn is two weeks late, but is at present growing rapidly; comparatively little goes into the silo. The quantity and quality of the hay crop is about normal. Corn is the principal forage crop, with some millet and oats; oats are rusting badly; corn late, but growing rapidly. Market-garden crops are little grown. Apples will be a light crop; other fruits not raised to any extent. Pastures are showing the effect of insufficient rains. It is too early to report as to rye, oats and barley. The season is still two weeks late, and the corn crop will be nearly a failure unless frost holds off until late in October.

Savoy (Willis W. Burnett). — Potato bugs are doing some damage. Indian corn is looking well, but is two weeks late; the greater part of the crop is grown for ensilage. The hay crop is a full average yield of superior quality. Corn and oats are raised for forage crops and are in fairly good condition, but backward. Potatoes are looking fairly well, but backward, none harvested. Apples promise a fair crop; other fruits little raised. Frequent showers have kept grass growing well in pastures. Rye, oats and barley promise average crops. Haying is not nearly completed as cutting began two weeks late and there has been much dull weather.

Williamstown (S. A. Hickox). — Potato bugs are doing some damage. Corn is late, having mostly been planted over, and one-third of the crop will be ensilaged. The hay crop is nearly an average crop in quantity and quality. Corn is the principal forage crop grown. Market-garden crops promise well. The prospect is very good for all kinds of fruit. Pastures are in good condition. Rye, oats and barley are 20 per cent below the normal.

FRANKLIN COUNTY.

Monroe (David H. Sherman). — Potato bugs and currant worms are doing some damage. Indian corn is late and most of it will be put into the silo. The hay crop is less than an average in quantity, but of good quality. Oats and peas, millet, barley and corn are the principal forage crops. Market-garden crops are not harvested as yet; potatoes blossoming, look well but late. Apples and pears are normal crops;

few plums; no peaches, trees all winterkilled; cranberries blossomed full. Pastures are in very good condition. Rye, oats and barley are not raised for grain; fair for forage. Haying is less than one-fourth completed.

Charlemont (J. M. J. Legate). — Potato bugs are the only insects doing damage and they are not very plentiful. Indian corn is very backward and most of it will be used for ensilage or dry fodder. Hay is above an average crop and the quality is of the best, but there still remains a good deal to cut. Little is raised for forage except corn. Potatoes are late, but generally looking well, none marketed as yet. Pastures are in good condition, showers coming often enough to keep them growing. Rye, oats and barley are little raised.

Leyden (Frank R. Foster). — Corn is backward; one-fourth of the crop is raised for ensilage. The hay crop is nearly up to the average though later than usual. Japanese millet, Hungarian grass and barley are the principal forage crops grown and are in good condition. Potatoes are looking well, but are late; none harvested as yet. The prospect for apples is good; pears poor; no peaches this year. Pasturage is in fine condition. Rye, oats and barley promise average crops.

Bernardston (R. H. Cushman). — Rose bugs are very plentiful and large flies of two species are very troublesome for cattle. Corn is making rapid growth; probably 75 per cent of the acreage goes into the silo. An average hay crop has been secured. Oats and millet are grown for hay and green feed. Potatoes look very promising. Apples will be a very light crop; no other fruits to make a showing. Pastures are in very good condition at this date. Rye, oats and barley have made a good growth.

Deerfield (Dwight A. Hawkes). — The potato bug is doing some damage. Corn has made a good growth, but is yet very late and the stand is poor and uneven; perhaps 8 per cent is raised for ensilage. The quantity of the hay crop is somewhat above the average and it is of good quality. Peas and oats, millet and sweet corn are the principal forage crops grown; condition good. No potatoes have been harvested as yet. Apples are half a crop and pears and peaches are very poor. Pasturage is in good condition. Tobacco is uneven and late. Onions promise well.

Sunderland (Geo. P. Smith). — Potato bugs are doing some damage. Indian corn is late but is growing rapidly; somewhat damaged by a heavy thunderstorm on the 20th. Quantity of hay crop above average and quality good. Very little is raised for forage except corn. Market-garden crops are generally good, with yield rather below average and prices rather above. There will be very little fruit, less than half a crop of apples. Pastures are in good condition. Rye, oats and barley are very little grown.

Northfield (T. R. Callender). — Potato bugs are not as numerous as usual. Corn is making a very rapid growth and is in fine condition; less than one-third the crop is raised for the silo. Hay is an average

crop of fine quality. Oats, millet and fodder corn are raised for forage and are all looking well. All garden crops are in good condition; potatoes are fully up to the average. Apples promise a fair yield. Pasturage is good for the time of year, but rain is needed on some hill pastures. Rye and oats are rather better than usual. All crops are late but the fine weather has been pushing them fast.

Wendell (N. D. Plumb). — Potato bugs are doing some damage. Indian corn is very backward, but is stocky and growing fast; about one-fourth the crop is raised for ensilage. The quality of the hay crop is good, but the yield is below normal. Barley, oats and corn are raised for forage and are all in fine condition. Potatoes are ten days later than usual, but are looking well; none harvested yet. Pastures are in the best condition for years. Rye, oats and barley are not raised for grain, very promising as forage crops.

New Salem (Daniel Ballard). — Potato bugs, rose bugs and striped squash bugs are doing some damage. Corn is backward, but is looking well and growing finely since the warm weather; only a small part is raised for ensilage. The hay crop is good in both quantity and quality. Corn, oats and Hungarian grass are the forage crops grown and are in fair condition. But little done in market-gardening; no potatoes harvested. There will be a light crop of fruit, especially apples, pears and peaches. Pasturage is holding out well. Rye, oats and barley are fair average crops.

HAMPSHIRE COUNTY.

Ware (J. H. Fletcher). — Potato bugs are doing some damage. Indian corn is late, but is looking nicely; not much will go into the silo. Hay is very good on well cared for land. Corn, barley and millet are the crops raised for forage and they are looking well. Market-garden crops are about average in yield and price. There will not be a very good crop of apples. Pasturage is in good condition just now. Rye, oats and barley are about average crops.

Greenwich (Walter H. Glazier). — Potato bugs and rose bugs are plentiful. Indian corn is looking well and growing rapidly; little, if any, will be put into the silo. There is a large crop of hay of good quality. There are small amounts of millet and Hungarian grass grown for forage, and they are looking well. Potatoes are doing well. Fruit is little grown. Pasturage is in excellent condition. Rye, oats and barley are little grown. Much hay is still uncut, as farmers were late in starting.

Pelham (John L. Brewer). — Potato bugs are doing some damage, and they have not been as plentiful and troublesome as some years. Corn is somewhat late, but of excellent color; only a small part will go into the silo. Sweet corn, millet, barley and oats are the principal forage crops raised. Potato vines never looked better; not many ripe as yet. Most fruit suffered from frosts; strawberries have been a fair

crop. Pastures are in excellent condition. Oats are not quite as good as usual. Low bush blueberries are quite plenty.

Amherst (Wm. P. Brooks). — No insects are proving exceptionally injurious. Indian corn is making a healthy growth, but is for the most part backward. The yield of hay is the heaviest and the quality the best ever seen here. Corn, millet and Hungarian grass, oats and peas and sorghum are raised for forage, and are in excellent condition. All market-garden crops have done well; potatoes look exceptionally well. Apples fair; hardly any pears raised; no peaches this year; no Japanese plums, other plums good; quinces good; grapes good. Rye looks well, but is not yet harvested.

South Hadley (W. F. Pearson). — Rose bugs and potato bugs are doing some damage. Corn is about three weeks later than usual and two-thirds of the crop will go into the silo. The hay crop is good, with quality better than usual. Millets are the principal forage crop, and look extra well. Garden crops are late; no potatoes harvested as yet. There will be very few apples and pears; grapes are looking fairly well. Pastures were never better at this season of the year. Rye is up to the average.

Hatfield (Thaddeus Graves). — Potato bugs are doing some damage. Indian corn is about ten days late. Quantity of the hay crop good and quality first class. No forage crops are raised as there are very few cows kept here. Potatoes for home use are the only market-garden crops grown. There will be a short crop of all fruits. Pasturage is about normal, as there has been plenty of rain. Rye, oats and barley are little raised. Both tobacco and onions are in fine condition and promise well.

Williamsburg (F. C. Richards). — Potato bugs are the principal insect doing damage. Corn is looking good and coming on well; about two-thirds of the crop is raised for ensilage. There is a heavy yield of hay of good quality. Oats are the principal forage crop and are looking well. Potatoes are looking well and promise a good crop. Apples half a crop; pears 15 per cent; quinces promise well. Feed in pastures is getting poor in quantity and quality. Rye, oats and barley are in good condition.

Westhampton (Levi Burt). — Potato bugs are doing some damage. Corn is from ten days to two weeks late, but is looking well; probably three-fourths of the crop will go into the silo. The hay crop was never better. Japanese millet and corn are the principal forage crops grown and are in good condition though late. Potatoes look well; no market-gardening here. Apples, plums and quinces good crops; no pears. Pastures are not as dry as is usual at this time. Rye, oats and barley are not raised.

Goshen (Alvan Barrus). — No insects are doing serious damage. Indian corn is backward but coming on fast; one-half the crop is raised for feed or for the silo. The late rains have brought the hay crop forward, but it is two weeks late. Corn, peas and oats are the

principal forage crops grown. Market-garden crops are not much grown. The prospect is poor for all fruits; apples are dropping badly. Pastures are in fair condition because lightly stocked. Rye and barley are fair average crops; oats below average.

HAMPDEN COUNTY.

Chester (C. Z. Inzell). — Potato bugs are doing some damage. Corn is looking well and about one-third of the crop will go into the silo. Hay is about a normal crop in quantity and quality. Japanese millet and corn are the principal forage crops grown. Apples promise a good crop. Pasturage is in fair condition.

Blandford (Enos W. Boise). — The potato bug is doing some damage. The warm weather has brought corn forward so that it is but little behind the normal. The hay crop is a trifle below normal in yield, but of extra quality. Corn, Hungarian grass and Japanese millet are the principal forage crops. Garden crops are looking well. No peaches; other fruits 80 per cent of a full yield. Pastures are short on account of short cropping in the spring. Rye, oats and barley are about normal crops.

Russell (E. D. Parks). — Potato bugs and currant worms are doing some damage. Indian corn is about two weeks late, but is looking finely and growing fast. Hay is an average crop, some claim more than average. Millet, Hungarian grass and corn are raised for forage and are in very good condition. Potatoes never looked better; very few early potatoes raised. Apples are looking well; small fruit poor on account of the cold, backward spring. Rye, oats and barley are average crops, but a little late. Pastures are in good condition.

Southwick (Luzern A. Fowler). — Potato bugs are doing some damage. Indian corn is looking well considering the late season; few silos in town. Oats, millet and Hungarian grass are the principal forage crops grown, and are in very good condition. But few potatoes have been harvested as yet. There is a fair crop of apples, few pears and no peaches. Pasturage is in very good condition. Rye and oats compare well with former years. The condition of tobacco has greatly improved in the past two weeks.

Agawam (J. G. Burt). — The insect proving most troublesome is the potato bug. Corn is a little late; half the crop will go into the silo. The hay crop is heavy and of good quality. Corn and barley are raised for the silo and are in fair condition. Market-garden crops are in good condition; potatoes look well, but none have been dug as yet. The prospect is poor for all fruits, owing to the late frost. Pastures are in good condition. Rye, oats and barley are about average crops. Onions and tobacco look well.

West Springfield (T. A. Rogers). — Potato bugs, the elm leaf beetle and striped squash bugs are doing some damage. Indian corn is looking well and growing fast, but is about ten days late; about half

the crop will go into the silo. The hay crop is above average in quantity and is A1 in quality. Oats and peas, corn, barley, Hungarian grass and millet are grown for forage. All kinds of market-garden crops are looking well; no new potatoes dug as yet. Apples and pears are about 60 per cent of a full crop; no peaches, plums and quinces; grapes promise well. Pasturage is short at the present time as the weather is hot and dry. Rye and oats are good crops.

Chicopee (E. L. Shaw). — Insects do not seem to be doing much damage as yet. Corn is growing fast now, especially where it was planted on light, warm land; more than half the crop will go into the silo. The hay crop is larger than usual and the quality is good except where injured by rain in curing. Rye, wheat, peas and oats, Japanese millet and corn are the principal forage crops; all are doing well though later than usual. Potatoes look well, but none have been harvested as yet. Apples are a good crop; pears fair; no peaches; plums few; no quinces; grapes fair. Pasturage is in good condition. Rye, oats and barley are rather heavier than usual.

Wilbraham (H. M. Bliss). — Indian corn is in fair condition, and 5 per cent of the crop will be put into the silo. The hay crop is within 20 per cent of the normal in quantity and is of excellent quality. Oats are the principal forage crop raised. Market-garden crops have yielded well and brought higher prices than usual. Apples 70 per cent; pears 65; no peaches; plums 75; quinces 70; grapes 60; cranberries 50. Pasturage is in good condition. Rye and oats are in good condition; no barley raised.

Holland (Francis Wight). — Potato bugs and striped squash bugs are doing some damage. Corn is doing well but is still a little backward; about one-third the crop will go into the silo. The hay crop is a full average in quantity and quality. Corn is the principal forage crop grown. There will be a light crop of fruit. Pastures are in good condition. Rye, oats and barley are about the same as in other years.

WORCESTER COUNTY.

Warren (W. E. Patrick). — Potato bugs and rose bugs are doing some damage, but there is less trouble than usual from insects. Indian corn is very backward, but is making good growth; only a small proportion goes into the silo. The quality of the hay crop is excellent and the quantity fully up to the average. Japanese millet and corn are the principal forage crops and are in fairly good condition. Potatoes are looking well, but none have been dug. Dry weather has shortened feed in pastures. Oats are not a large crop; not much rye or barley raised.

New Braintree (Charles D. Sage). — Potato bugs are doing some damage. Corn is growing well, but is very late; perhaps half the crop will be ensilaged. Quantity of the hay crop 25 per cent above the

average and quality excellent. Corn and Japanese millet are the forage crops grown. Potatoes are looking well. The fruit crop will be light, although the bloom was very full. Pasturage is very good for the time of year. Rye, oats and barley look well; very little harvested.

North Brookfield (John H. Lane). — Potato bugs and cucumber beetles have done damage. Indian corn is in very poor condition; half the crop goes into the silo. There is the usual quantity of hay, but it has been damaged by poor weather. Millet and Hungarian grass are the forage crops grown. Some fields of potatoes are very uneven. Apples 45 per cent of a crop; pears 20; no peaches or quinces; plums 10. Pasturage is poor, owing to cold and dry weather.

Dana (Lyman Randall). — Potato bugs and rose bugs are doing damage. Corn is looking finely, but is late; one-half the crop is grown for ensilage. The hay crop is larger than for several years and of extra quality. Corn and oats are raised for forage and are growing rapidly. Market-garden crops are good, with prices fully as high as usual. The prospect is not very encouraging for fruit of any kind. Pasturage is very good. Oats are in good condition; rye and barley little raised.

Barre (John L. Smith). — Potato bugs and rose bugs are doing some damage. Corn is late and uneven; 90 per cent of the crop will be put into the silo. There is more than an average crop of hay of good quality. Corn and millet are the principal forage crops grown. Potatoes are looking extra well. There will be a fair yield of fruit of the various kinds. Pastures are in very good condition. Oats are about an average crop; rye and barley not raised.

Hubbardston (Chas. C. Colby). — Indian corn is very backward; possibly 80 per cent of the crop will be used for ensilage. The hay crop is much above the average both in quantity and quality. There is about the usual amount of forage crops grown, — oats, millet, Hungarian grass, rye and barley, — and they are making good growth. Potatoes are looking well. There is the prospect of a good crop of apples. Pastures are in fine condition and stock is doing well.

Gardner (W. E. Knight). — Insects are doing very little damage. Corn is a little late and very uneven; the entire crop is grown for the silo. The quantity of the hay crop is above the average and the quality first class. Oats, millet and barley are raised for forage. Potatoes look well. There will be a fair crop of apples. Pasturage is good, but cows are falling off in milk badly. Rye, oats and barley are normal crops, and are grown only for forage.

Ashburnham (E. D. Gibson). — Rose bugs are doing some damage. Indian corn is backward, but is growing finely. The hay crop is above the average in quantity and quality. Millet, Hungarian grass, oats and barley are raised for forage and are all looking finely. Potatoes are two weeks late; garden crops not yet in the market to any extent.

Apples will be a light crop and grapes a fair crop. Pastures are in good condition. Rye, oats and barley are average crops.

Fitchburg (Dr. Jabez Fisher). — Very few insects are found to be present. The recent hot weather has brought corn forward, and it now looks promising. The hay crop is nearly up to the average and of good quality. Apples will be 25 per cent of a full crop; pears 30; plums 75; grapes 70; no peaches. Pasturage is in good condition.

Harvard (John S. Preston). — There is little damage from insects; more spraying than usual this spring. Indian corn is looking well, but a little short. The hay crop is large in quantity and good in quality. Oats, Hungarian grass, millet and rye are raised for forage and are all looking well. Market-garden crops have yielded well and brought good prices. Apples are about half a crop; pears light; no peaches. Pastures are looking very well indeed. Rye, oats and barley are looking well; little raised for grain.

Southborough (E. F. Collins). — Insects are not as numerous as usual. Corn is two weeks late, but growing well; mostly raised for the silo. The hay crop is the largest ever harvested and of excellent quality. Hungarian grass and Japanese millet are raised for forage. Market-garden crops are late, but are looking well. Apples did not set well, but will be a fair crop.

Shrewsbury (Fred J. Reed). — Squash and potato bugs are doing some damage. Indian corn is backward and none of the crop will go into the silo. There is an average crop of hay of very good quality. Millet and corn are the principal forage crops grown, and are in very good condition. Market-garden crops are very good and bring about average prices. There will be few apples; no peaches; plums fair; other fruits average. Pasturage is in fair condition, but needs a good rain. Rye, oats and barley are about normal crops.

Worcester (H. R. Kinney). — Potato bugs are doing some damage. The corn crop is late, and on some fields the stand is poor, but it is growing well; most of it will be put into the silo. There is a good crop of hay and the quality is good, where secured without damage from rain. Corn and millet are the favorite forage crops, but are late and weedy. Market-garden crops are very late, but are growing rapidly; prices so far have only been fair. There will be a few apples; all other fruits very light. The condition of pasturage is very good for the time of year. Rye, oats and barley are about average crops.

Leicester (H. H. Kingsbury). — Potato bugs are doing some damage. Corn is making a fine growth, though backward. There is a large yield of hay in prospect, and it is of good quality. Barley, millet and corn are the principal forage crops grown. Garden crops are luxuriant. The fruit crop appears to be a light one. Pasturage is in excellent condition. Wild and cultivated blackberries blossomed full; blueberries very scarce.

Dudley (J. J. Gilles). — Potato bugs and rose bugs are doing some

damage. Indian corn is late but is growing finely; two-thirds of the crop will be put into the silo. The hay crop is fully 15 per cent above the average in quantity and of fine quality. Oats, rye and peas, millet and sweet corn are the principal forage crops grown. Fruit is little raised for market. Pastures are in average condition, but need rain now; up to July 1st they were above average. Rye, oats and barley are average crops.

MIDDLESEX COUNTY.

Hopkinton (W. V. Thompson). — Potato bugs are doing some damage. Indian corn is in good condition, but is late; most of the crop goes into the silo. The hay crop is a good one but somewhat late. Japanese millet is the principal forage crop, and is looking well. Potatoes look well. There will be few apples and pears; no peaches or plums; rose bugs are doing much damage to grapes. There are no pastures hereabouts. Rye, oats and barley look well as forage crops.

Framingham (J. S. Williams). — Potato bugs, rose bugs and squash bugs are doing some damage. Corn is making a splendid growth, with good color, though late planted and slow to start; probably two-thirds of the acreage is raised for ensilage. There is a heavy crop of hay and the quality is good. Corn, oats, Hungarian grass and barley are the forage crops grown, and all have made fair growth. Market-garden crops are doing well and bringing good prices; potato vines are heavy. Apples have dropped to some extent and the outlook for fruit is not very promising. Pastures need rain as the ground is getting dry. Rye, oats and barley made good growths and headed well. Onions look exceptionally well.

Sudbury (E. W. Goodnow). — Gypsy moth caterpillars and potato bugs are our most troublesome insects. Indian corn is looking well and the greater proportion will be put into the silo. The hay crop is about a normal one. Barley, millet and Hungarian grass are being raised as forage crops. Market-garden crops are not looking well, and prices have been lower than usual. Apples, pears, peaches and fruit of all kinds are backward and there seems little prospect of a good crop. The condition of pasturage is very poor. Rye, oats and barley are looking fairly well.

Stow (Geo. W. Bradley). — Rose bugs and potato bugs are doing some damage. Indian corn is not quite up to the standard, but is coming along fast; very little will be put into the silo. The hay crop is better than last year, both in quantity and quality. Oats, Japanese millet and Hungarian grass are the principal forage crops grown; oats are looking well, others not far advanced. Potatoes are looking finely, but none have been harvested. Apples promise a good crop; pears fair; other fruits scarce. Pastures are in very good condition. Rye is a fair crop; oats good. Tomatoes are fruiting well in some sections and poorly in others.

Littleton (Geo. W. Sanderson). — Corn is late, but has gained rapidly during the past two weeks; probably three-fourths of the crop goes into the silo. There is more than an average hay crop of better quality than last year. Hungarian grass, millet and corn are the principal forage crops, and all are in good condition. Potatoes promise excellently, but hardly any have been harvested. The prospect is not very promising for fruit of all kinds. Pasturage is good up to the present. Rye, oats and barley are about average crops.

Townsend (G. A. Wilder). — Rose bugs are doing some damage. Indian corn is in good condition and three-fourths of the crop goes into the silo. The hay crop is rather lighter than usual and of good quality. Market-garden crops have been good, though rather late, with prices about as usual. There is very little fruit. Rye, oats and barley are about average crops. Pasturage is in fair condition.

Chelmsford (P. P. Perham). — Potato bugs and rose bugs are the most troublesome insects. Corn is looking finely and half the crop will be put into the silo. There is a large crop of hay of excellent quality. A large acreage of oats is grown to feed green. Market-garden crops, including potatoes, promise well. Apples are dropping very badly; no peaches or grapes. Pastures are in good condition. Rye, oats and barley promise good average crops.

Carlisle (Alvah Carr). — Potato bugs and squash bugs are doing some damage. Corn is looking very promising, although quite backward. Hay is a good crop, yield very heavy. Corn, Japanese millet, and oats and peas are raised for forage, and they are all looking well. Market-garden crops are looking well, especially potatoes; few potatoes harvested as yet. There are few if any apples, pears, peaches, plums or quinces, but good yields of grapes and cranberries. Pastures have done their best for the season and are rather short. Rye, oats and barley are in good condition as forage crops.

Concord (Wm. H. Hunt). — Insects have been less troublesome this year than usual. Corn is now growing very rapidly. The hay crop turns out to be better than was promised. Corn, oats, barley and millet are the forage crops grown and they are looking well. Potatoes and market-garden crops look well, and prices have been good. Apples are uneven; pears a small crop; no peaches; other crops average. Pastures are quite up to the average. Rye, oats and barley have done well, but are late.

Winchester (S. S. Symmes). — Potato bugs are very plentiful. Indian corn is not raised. There was a heavy hay crop of first class quality. Market-garden crops have yielded well, but are very late. Beans are much better than usual. Apples and pears promise half a crop; no peaches; few plums. Rye is a good crop; no oats or barley grown. Last year at this date tomatoes were being sold in large quantities, there are no ripe ones now and the green ones are not fully grown.

Stoneham (J. E. Wiley). — Potato bugs and currant worms are doing some damage. There is above an average hay crop, in both quantity and quality. Market-garden crops, including potatoes, are fair average yield, and bring normal prices. Apples good; pears fair; grapes good. Pasturage is in good condition.

Newton (G. L. Marcy). — We have some gypsy moth caterpillars, but other insects are not numerous. Field corn is not raised, but sweet corn is doing well. The hay crop was of good quality and average quantity. Millet and corn are the principal forage crops, but they are not doing as well as usual, owing to dry weather. Market-garden crops are in good condition. The fruit crop will be below the average, the dry weather hurting the prospect. Pastures are in poor condition at present. Rye, oats and barley are good crops.

ESSEX COUNTY.

Groveland (A. S. Longfellow). — Potato bugs and gypsy moths are doing some damage. Corn is growing very fast; one-third the crop will go into the silo. The quantity of the hay crop is abundant and the quality good. Corn is the principal forage crop grown, and is in good condition. Market-garden crops are looking well and bringing good prices. There will be a limited crop of apples, but not much other fruit. Pasturage is in good condition, owing to frequent rains. Rye, oats and barley are up to the average.

Salisbury (Wesley Pettengill). — Potato bugs are the most troublesome insect. Indian corn is looking well, the rains and hot weather having pushed it right ahead. The hay crop is good in quantity and quality. Corn and Hungarian grass, with some oats and barley, are grown for forage, and are looking well. Market-garden crops are looking finely and prices are good. Apples are a fair crop; pears few; no peaches; no plums; grapes light. Pastures are good for the time of year, recent rains having kept them along nicely. Rye, oats and barley look well as forage crops.

Andover (Milo H. Gould). — Potato bugs are doing some damage. Indian corn is two weeks later than usual, but is looking well; most of the crop is grown for the silo. Quantity of the hay crop nearly up to average and quality good. Peas and oats and Hungarian grass are the principal forage crops grown and are in good condition. Potatoes look well; prices on beets high and on peas low. There will be a light crop of apples, pears, peaches and plums; cranberries good. Pastures are in very good condition. Rye, oats and barley are good as forage crops. Strawberries proved a good crop in this locality.

Hamilton (George R. Dodge). — Gypsy moth caterpillars are more numerous than usual. Corn is somewhat backward, but the warm weather is fast bringing it up to the normal; 90 per cent of the crop is ensilaged. The hay crop is fully up to the average. The usual

forage crops are Hungarian grass and Japanese millet, corn and oats; condition fair to good. There is complaint of potatoes and tomatoes running to vine; peas have yielded well, but prices have been low. Apples and pears are few; stone fruits none at all. Pasturage has been good, but rain is now much needed. Rye, oats and barley are normal crops for forage.

Essex (Aaron Low). — Insects have not been as troublesome as usual. Indian corn is in excellent condition; only a small proportion of the crop goes into the silo. There was a large crop of hay, secured in fine shape. Corn and rye are the principal forage crops. Market-garden crops have been rather below the average. Apples fair; other fruits light. Pasturage is in good condition. Rye, oats and barley are about normal crops.

Manchester (John Baker). — Gypsy moths are doing some damage. Corn promises a good yield; none raised for the silo. The hay crop is a third above the average. Corn, oats and barley are the principal forage crops grown and are in good condition. Market-garden crops are in good condition and bring good prices. There will be a half crop of apples; few pears; no peaches or plums; few grapes. Pasturage is in good condition. Rye, oats and barley are normal crops.

NORFOLK COUNTY.

Cohasset (Ellery C. Bates). — No insects are doing damage. Indian corn is not raised in this locality. The hay crop was large in quantity and of good quality. Market-garden crops have done well, considering the dry season; no potatoes harvested as yet. The prospect is good for all kinds of fruit. Pasturage is in good condition, considering the dry weather. Rye, oats and barley are not raised.

Randolph (Rufus A. Thayer). — Squash bugs and potato beetles are doing some damage. Corn is late but very thrifty; nine-tenths of the crop is raised for ensilage. There was a good normal crop of hay. Oats, Hungarian grass and corn are the principal forage crops grown, and all are in good condition. Market-garden crops are average in yield and price and potatoes are growing finely. Apples promise half a crop; pears a small crop; grapes set well. Pastures are in need of rain at present. Rye, oats and barley are grown only for forage and are good crops.

Westwood (Henry E. Weatherbee). — Potato bugs are very plenty and rose bugs have done considerable damage; army worms are also reported. Corn is looking well. The hay crop is first class, both in quantity and quality. Corn, Japanese millet and Hungarian grass are being raised as soiling crops. There has been a good yield or peas and beans at average prices; potatoes look well, but need rain. Apples, pears and grapes will be very fair crops; very few peaches, plums and quinces. The pastures are feeling the effects of dry weather. Rye is a good crop, but oats are rather light.

Walpole (Edward L. Shepard). — Potato bugs are doing some damage. Indian corn is late and poor; about half the crop is raised for the silo. The hay crop is 25 per cent above the average in quantity and of good quality. Corn, oats, Hungarian grass and the millets are raised for forage, first two poor, others looking fairly well. Garden crops are suffering from drought. Apples and pears promise half crops; no peaches. Pasturage has been fairly good, but is now suffering from drought. Rye, oats and barley are not up to the normal.

Franklin (C. M. Allen). — Insects are fewer than usual. Corn is backward and nearly all of the crop is raised for the silo. The hay crop was an unusually good one. Rye, oats, millet and barley are raised for forage and are looking well. All garden crops are late; potatoes about average. There will be a light crop of fruits of all kinds. Pastures have been good, but are rather dry at present. The berry crop has been better than usual.

Bellingham (John J. O'Sullivan). — Potato bugs are doing some damage. Indian corn is a little backward; 20 per cent of the crop goes into the silo. The hay crop is a little above the average in quantity and quality. Hungarian grass, Japanese millet and corn are the principal forage crops and are in fair condition. Condition of market-garden crops fair, yield fair and prices good. Apples fair; pears poor; peaches poor; grapes good; quinces good; plums poor; grapes and cranberries good. Pasturage is in fair condition, but needs rain. Rye, oats and barley are about average crops.

BRISTOL COUNTY.

Mansfield (Wm. C. Winter). — Potato bugs and rose bugs are doing some damage. Indian corn is a little backward, but improving with the warm weather; very little goes into the silo. The hay crop is somewhat above normal in quantity and of excellent quality. Market-garden crops are generally poor; early peas good and brought good prices. Apples and pears will be light crops; no peaches; plums poor; grapes late but medium; quinces good. Pastures are badly dried up. Rye, oats and barley are up to the average, but not much grown. Rain is badly needed.

Attleborough (Isaac Alger). — Potato bugs are doing some damage. Corn is in good condition, and the larger part of the crop is grown for ensilage. There is a full average crop of hay of good quality. Corn and millet are the principal forage crops and are in good condition. Potatoes are looking finely where sprayed. The apple crop will be lighter than the bloom indicated; no pears or peaches; grapes and cranberries fair. Pasturage is in fairly good condition. Rye, oats and barley are about average crops.

Dighton (James N. Paul). — Potato bugs are doing some damage. Corn is in good condition; very little will be put into the silo. Quantity of hay above normal and quality good. Corn, Hungarian grass,

oats, rye and barley are the principal forage crops grown. Market-garden crops are in good condition; potatoes fair; all need rain; prices good. Apples have dropped badly; no pears; other fruits not grown. Pasturage is in good condition. The strawberry crop was very good in quantity and quality, but very unsatisfactory as to prices received.

Swansea (F. G. Arnold). — Potato bugs are doing some damage. Indian corn looks well, though late; only five silos in town. The hay crop is above the average in quantity and quality. Corn is the principal forage crop and is in good condition. Potatoes look very poorly on account of lack of rain; cabbages fair, and prices good. The prospect is very poor for all fruits. Pastures were very good up to July 10th, but since then have been very dry. Rye, oats and barley are about average crops.

Westport (Albert S. Sherman). — Potato bugs and rose bugs are numerous, and plant lice are also present. Corn is not forward, having been planted late; little grown for ensilage. The hay crop was a large one and of good quality. Oats and fodder corn are quite extensively raised as forage crops and are looking well. Potatoes are in fine condition; none yet harvested. The prospect for all kinds of fruit is very poor; apples set plenty but have nearly all fallen off. Pasturage is getting very short. Rye and oats are good crops. Many crops are suffering from drought.

Acushnet (M. S. Douglas). — Potato bugs and Hessian flies are numerous. Indian corn did not come up well and is very backward. The hay crop is a fifth above the normal in quantity and of good quality. Millet is the principal forage crop, and owing to dry weather it has not made much growth. Market-garden crops are not promising, owing to dry weather. Prospect for apples fair; poor for other fruits. Pastures are short, owing to drought. Rye, oats and barley have done well. Potatoes will be a failure unless rain comes soon.

PLYMOUTH COUNTY.

Brockton (Davis Copeland). — Potato bugs, squash bugs and cut worms are doing some damage. Indian corn is very backward; probably a third of the crop goes into the silo. There is a very large crop of hay of good quality. Corn, oats and peas are the principal forage crops. Market-garden crops already harvested gave average yields and brought average prices; growing crops need rain. Grapes promise well; apples blossomed full but no fruit remains on the trees. Pastures are short and dry. Rye, oats and barley are good crops.

Marshfield (John H. Bourne). — Gypsy moths, potato bugs, rose bugs and cattle flies are doing damage. Corn is mostly backward, but some is large and strong; very little is used for ensilage. The hay crop was fully average in quantity and of good quality. Rye, oats and Japanese millet were the principal forage crops grown. Market-garden

crops are late and suffering from drought. Apples will be less than an average crop; few pears; fewer peaches and plums; grapes and cranberries good. Rye, oats and barley are average crops. Pasturage is drying up.

Hanover (Harrison L. House). — Potato bugs and Hessian flies are plenty. Indian corn is in good condition; very little is raised for ensilage. The hay crop was a good one in both quantity and quality. Market-garden crops are in good condition; potatoes did not come up well and are rather below the average. The prospect for apples, pears, quinces and grapes is good; for plums and peaches poor; for cranberries excellent. Pasturage is getting rather dry. Rye, oats and barley are little raised.

Plympton (Winthrop Fillebrown). — Gypsy moths and potato bugs are proving troublesome. Indian corn is growing fast, though planted late. The hay crop is up to the average in quantity; quality exceptionally good. Corn, rye and millet are the principal forage crops grown and are doing well. Market-garden crops are suffering from lack of rain. Apples and small fruits promise well; cranberries bloomed full. Pastures are getting short on upland. Rye, oats and barley are average crops.

Carver (J. A. Vaughan). — Potato bugs are very plenty, and there are some squash bugs. The small amount of Indian corn planted is looking well; no silos here. There is a good crop of hay and it is being harvested in good condition. Corn and Hungarian grass are grown for forage crops. Potatoes came up nicely but are suffering from bugs and drought. There is little fruit of any kind except cranberries, which promise a large crop. Pastures are about all dried up. There was a large crop of strawberries.

Lakeville (Nathaniel G. Staples). — Potato bugs and rose bugs are doing some damage. Indian corn is in fair condition; about one per cent of the crop goes into the silo. Hay was about an average crop of good quality. Corn is the principal forage crop grown and is in good condition. Potatoes look well, but are late, and unless rain comes soon will suffer. The prospect is poor for all fruits except grapes and cranberries. Pastures are all dried up. Rye, oats and barley are a little below the average.

Rochester (Geo. H. Randall). — Potato bugs, Hessian flies and currant worms are doing some damage. Corn has grown rapidly; very little is raised for ensilage. The hay crop has been secured in good condition. Corn, millet, barley and peas are the principal forage crops, and are not coming up well, owing to dry weather. Potatoes and garden crops are suffering from drought; few, if any, potatoes harvested. There will be very few apples, pears or plums; no peaches; few grapes; cranberry bloom full. Pasturage is short and drying up rapidly. Rye, oats and barley are about average crops. Onions are looking well but need rain.

BARNSTABLE COUNTY.

Bourne (David D. Nye). — Potato bugs are doing some damage. There are no silos and very little Indian corn raised in town. The hay crop was about normal in quantity and quality. Roots, and fodder corn are the principal forage crops grown. No market-garden crops have been harvested; the potato crop will be small unless we have rain soon. Fruit is quite scarce; cranberries will fail without rain. Pastures have been very good, but dry weather is cutting off the feed. Rye, oats and barley are about normal crops.

Mashpee (W. F. Hammond). — Potato bugs are doing some damage. Indian corn is late, but is looking well for the season. There was about a two-thirds crop of hay of good quality. Corn and oats are the principal forage crops grown. Garden crops are below the average, but prices have been above the average. Apples and pears promise half crops; grapes and cranberries two-thirds crops. Pasturage is good. Rye and oats will give average yields.

Barnstable (John Bursley). — Potato bugs are very numerous. Corn is growing quite rapidly, but is still very small; none raised for ensilage. There was an average yield of hay. Oats and corn are the principal forage crops grown. The sharp drought is hurting market-garden crops badly, prices a little higher than usual. All fruit set thinly, cranberries even not showing up well. Pasturage is very short, no rain since early in June. Rye is very heavy; oats very light, not over one-third of a crop.

Harwich (Ambrose N. Doane). — Cranberry vine worms are doing some damage. Indian corn is looking well; only one silo in town. There is a fair crop of hay, but it is of poor quality owing to dry weather. There is a small yield of market-garden crops. Cranberries are a fair crop; all other kinds of fruit short. Pastures are in poor condition, owing to long continued dry weather. Rye, oats and barley are average crops.

Wellfleet (Everett S. Jacobs). — Squash bugs are doing some damage. There are no silos in this vicinity and very little corn is raised. Forage crops are little grown. All kinds of market-garden crops are about a failure, owing to dry weather. There will be no apples, few pears, and all other fruits are below the average. Pasturage is in very poor condition. Rye, oats and barley are not raised.

Truro (John B. Dyer). — Potato bugs and striped squash bugs are doing damage. Indian corn is a poor crop; no silos here. The hay crop was fairly good. Some corn is planted for forage. Upland garden crops are nearly a failure owing to the long severe drought. The prospect for apples is not great, except that there will be a few Baldwins; cranberries have blossomed well. Pastures are exceedingly dry. No rain of consequence has fallen for weeks.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — Potato bugs and squash bugs are doing some damage. Corn is in fine condition and only a small proportion of the crop will be put into the silo. There was a good average crop of hay of first-class quality. Corn is the principal forage crop grown. Market-garden crops are below the average, and unless we have rain soon will be a failure. The prospect is poor for all fruits. Pastures have been good up to the present time, but are now drying up. Oats are a poor crop.

NANTUCKET COUNTY.

Nantucket (H. G. Worth). — Potato bugs are doing some damage. Corn is in good condition; no silos in this county. There was a good crop of hay, fully up to the average. Oats and corn are the principal forage crops grown. Market-garden crops are doing well and prices are fully up to the normal. Cranberries promise a good yield. Since the rains the pastures are in good condition. Rye, oats and barley are normal crops.

BULLETIN OF

MASSACHUSETTS BOARD OF AGRICULTURE.

HATCHING AND REARING CHICKS BY NATURAL METHODS ON THE FARM.

By JOHN S. ROBINSON, *Editor, "Farm Poultry."*

A leading manufacturer of incubators is my authority for the statement that there are in the United States and Canada about one hundred and thirty concerns manufacturing incubators and brooders. Many of these are small establishments, whose separate output is comparatively insignificant, but the aggregate output of these small factories must be very large, and there must be fully two score of concerns manufacturing on a large scale, the largest turning out hundreds of incubators and brooders daily. Though the total production of these machines for the hatching and brooding of chicks is greater now than ever before, it has for years been large, and when we consider that a well-made incubator ought to last for a good many years, it would seem that the increasing number of incubators and brooders sold must indicate a general substitution of artificial for natural methods of hatching and rearing chicks, and the early advent of the era to which some enthusiasts in artificial methods look forward, when the hen will have nothing to do but produce eggs.

The incubators and brooders sold do not necessarily represent hens put out of commission as mothers. To just what extent they actually displace hens it would be impossible to determine, but where they are most used their service is either in supplementing natural methods or in lines which could not be developed on a large scale by such methods. The incubators and brooders sold also go very largely into the hands of beginners in poultry keeping, who, without any actual knowledge of methods upon which to base a preference, take the artificial method as presumably the latest, most scientific and most up to date. Then there are always poultry keepers expert in natural methods who for various reasons want to try the other system, while the enormous volume of advertising artificial methods keeps constantly before the public, often in grossly exaggerated statements, the advantages of such methods. So it might well be said that the great output of incu-

bators and brooders goes to meet fictitious as well as real demands. It may also well be said that by different manufacturers these demands are met with machines of very different quality and possibilities, and as one result of this state of affairs an enormous proportion of the incubators and brooders sold each season does not go into permanent, practical use.

Thousands and thousands of the cheaper machines will hatch well only while new, and under the most favorable circumstances. Thousands of poultry keepers who buy good machines never learn to run them satisfactorily. They may continue to use them experimentally for some years, but in the end they go back to natural methods as easier and better for them. And the question which is the better method in the end comes to a question of circumstances and of the aptitudes of individuals. Some people can do so much better with artificial methods that they prefer them under any circumstances. Some can use either method successfully. Others get their best results by natural methods. So natural methods continue to be used and used very extensively, and, further, the competition of methods has without doubt served to give a better general understanding of the weak points of natural methods and the best ways of treating them.

However much he may in his innocence have been deluded by the representations of those interested in selling the goods, the operator of incubators and brooders soon finds that these mechanical contrivances are not self-operating. He has to tend them constantly and carefully, and give a great deal of thought to what at first seemed the trivial matter of putting into practice the few simple directions for operating which accompanied the machine. He learns in time (if he succeeds) that to have his machines work well he must, in working with them, be methodical and regular, and, as far as possible, furnish conditions of operation which are favorable.

Favorable conditions, regularity and system seem necessary and fitting parts of a method in which mechanical contrivances have an important part, but all do not readily see their importance in methods when results do not depend upon them absolutely. So it happens that in the hatching and rearing of chicks by natural methods there is too often nothing resembling a system, and no well-advised effort to get all the benefits of natural agencies while avoiding the losses which are apt to occur when natural agents are not well ordered.

The farm furnishes as near an approach to purely natural conditions for the production of poultry as we can have for domesticated fowls, yet it is a most exceptional farm that offers conditions which admit of leaving the poultry — particularly the young poultry — to itself. In a state of nature the tendency is for such creatures as fowls to maintain themselves in about the same numbers on the same area year after year. This means that the great majority of the young produced must

succumb to their natural enemies or to the rigors of natural conditions before reaching maturity. Now, though the domestic hen may be far more prolific of eggs than her wild counterpart, she is also an expense to her owner, and his profit upon her is measured not by the number of eggs she may lay but by the difference between the value of her produce and the cost of her keep. In the matter of eggs, it would be no great advantage to the owner of hens that they were great layers if their eggs were lost or destroyed. So it is usual for poultry keepers on farms either to make provisions for the poultry which compel the hens to lay in the places provided for them, or to keep close watch on all places within the range of the flock where hens might lay, and collect all eggs while in good condition. There may be a percentage of loss between the laying and collecting of the eggs, but it is not often a very large one.

In the hatching and rearing of chicks come the heaviest losses of most poultry keepers on farms, and to a very great extent these losses are not necessary and could easily be avoided. To make separate special provision for the losses from all possible different sources is not practicable. The practical and effective way to avoid losses and make the most of natural facilities for hatching and growing chicks is to systematize the work, and make the same sort of provision for getting full results from natural methods as is usual when artificial methods are used.

The incubator operator provides for his machines a place where, to the best of his judgment, conditions are favorable. The poultryman hatching with hens too often provides no suitable place, or sets hens any way and in any place. The brooder operator provides very carefully for his chicks and for his own convenience in caring for them, but when hens do the brooding, there is apt to be too great variety in accommodations to admit of uniformity in treatment, and, while that may mean some saving in cost of equipment, it usually means also an increased cost of labor, and whether it is labor he does himself or labor he pays for, the increased cost of labor comes out of the poultry keeper, either in the form of harder work or as diminished product and profit.

Provide for the setting hens exclusive quarters, and for the hens with chicks coops of substantially the same size and type, and a piece of land of such extent and character that the chicks have all the advantage of range and freedom without being so much scattered that the work of looking after them four or five times daily is too laborious.

If this is done, and a reasonable amount of attention given the chicks up to the weaning age, losses up to that point should be small, and the stock on hand at that stage much better developed than when the work is not so thoroughly done.

When any considerable number of chicks is to be hatched by hens it is advisable to set as many hens as possible at the same time, and preferable to have a certain day of the week for setting hens, and set

none at other times. This simple little point of practice introduces at once an element of regularity in the work which would have a marked influence all through, even if no other effort to secure regularity were made.

Make the nests in banks or tiers, built up like shelving in a store, or perhaps more graphically described as resembling a sectional bookcase. The nests need no back, for they are placed against the wall. The fronts should have covers of slats, or of a board just wide enough to leave space for air above and below it. Each cover should be the length of a section, opening and closing all nests in one section together. The covers should be hinged at the bottom (leather hinges will do), because they must be fastened when closed, but if hinged at the top, they must be fastened to keep them open as well. Besides this, the cover front hinged at the bottom may be used as a running board in front of the nests if so desired. For ordinary hens nests should be twelve inches square, inside measurement. For nesting material use short, fine hay or broken straw, and shape the nest well with the hand. If the nest is not shaped before the eggs are put in it, and the material well pressed down, eggs are likely to be broken during the first days of incubation.

Set only hens that are evidently in good health, and give the preference to those in fair flesh. Set no hen that is not easily handled after dark or that will fly from the nest if approached by daylight. To have hens that are healthy, quiet and easily handled means freedom from a large portion of the usual losses in the early weeks of the chick's life, as well as during incubation.

Select for incubation, eggs of uniform size and good form and color. If for any reason it is desired to set some eggs larger or smaller than the average, sort the eggs and give the special sizes to separate hens. The rule of thirteen eggs to a hen is a good one to follow if all nests are twelve inches by twelve inches. Some hens can cover more, but, for a reason which will shortly appear, the number of eggs should be adapted to the smallest hens in the lot. If nests are of different sizes the largest nests and hens may have more eggs, though fifteen is as large a number as it is advisable to give any hen.

Have the hens come off for food and water daily. If a large number of hens are set at the same time — all the apartment will contain — they may all be let off together and the nests closed while they eat, drink and dust themselves. If the floor is of earth, without too much broken droppings in it, no special dusting box need be provided. The food should be corn or other hard grain, corn preferred, and whole corn used rather than cracked corn. For the first few days the hens should be watched closely, to prevent fighting. After they become used to the place and to each other, the attendant may let them out, close the nests, and leave them until time to return them to the nests, — twenty minutes to half an hour. In returning hens to the nest

make no effort to have the hens go back to the same nests. On the contrary, if any are noticed which persistently take a certain nest return them to another. By doing this all eggs have the same treatment. A hen that, if on the same eggs continuously for three weeks, would make a poor hatch, is never on one nest long enough to specially affect the eggs in it, and the results are better average hatches and a larger total hatch.

Dust the hens with an insect powder when setting them, again about the tenth day, and again about the nineteenth day, just before the eggs begin to pip. After the hens return to the nests remove the droppings before they are broken into the floor, and the place will be free from the peculiarly offensive odor too common where hens are setting.

Test the eggs the seventh day and again the fourteenth day. A metal chimney for testing, which may be used with a common lamp, may be purchased at any poultry supply house. An infertile egg remains clear throughout the period of incubation. A fertile egg at the seventh day shows quite opaque, with the air cell at the larger end sharply defined and in the same position with reference to the shell as the egg is turned before the light. If the germ is dead, but the egg not yet decomposed, the dead germ may show as a dark or bloody spot in the opaque contents of the egg. If the egg is rotten, the line of the air cell will remain horizontal as the egg is turned before the light.

Unless fertility is exceptionally good, enough eggs will be taken out at this test to release one or two hens, the eggs from their nests being used to fill others, and they either reset with the next lot, or returned to the laying pens. If the eggs were fresh when set there will rarely be rotten eggs to take out at the first test. The test on the fourteenth day discovers most eggs that will not have full-formed chickens at the end of the period of incubation, and it is important that these should be removed, for the rotten egg is the egg that breaks, and broken eggs not only make a nasty mess to clean up, but injure the chicks in the eggs which are soiled, and thus reduce the prospects of a hatch. Unless an unusual number of eggs should be taken out at the second test, it is as well not to double up again.

After the eggs begin to pip keep the hens on the nests until the hatch is completed. This will usually be in thirty-six hours. Look into the nests enough to see that things are progressing right, to clear away shells as they accumulate and to see that no chick is smothered by an empty shell capping the egg containing it. If a hen is so restless that she tramples her chicks, exchange her for a quieter one from a lot set later.

When the chicks are all dry remove them from the nests to coops previously made ready for them, giving each hen from twelve to twenty chicks, according to the season. Select as mothers the hens that are in the best condition and most thrifty looking.

Up to this point the farm has offered no special advantages over what would exist anywhere where there was a vacant pen in the poultry house, or a convenient shed or outbuilding that could be used for the sitters. From this point the farm has great advantages, and they should be fully utilized. Even a farm too small to give fowls free range without their trespassing on neighbors has advantages far surpassing those of the town poultryman, who must make up for lack of natural advantages by special care to provide variety in food, to maintain a healthful cleanliness and to guard against the evils incident to the crowding of chicks on limited areas.

What farm is so small that, if the matter were systematically provided for, it could not furnish new ground, on which the grass was well established, each year for the little chicks? With hay at the prices which prevail in Massachusetts it seems sometimes almost a crime to put chicks on mowing land before a crop has been taken from it, but if there is no part of the pasture or orchard available for small chicks, and convenient to the house, it will certainly pay the grower of chickens to give up to the smallest of them a piece of grass land as large as they need. That would be a piece as small as they could keep the grass down on without killing it out. In an ordinary season this would be a piece as large as required to place the coops about two rods apart each way and have a margin about two rods wide outside the coops all around the plot. In a wet season, or where the growth was rank, the coops should be closer together; under the opposite conditions, farther apart. The loss of hay from the land given up to the chicks would be at least in part made up by the heavier crop from the piece next year, for the droppings of the chicks will distribute quite evenly over it a high-grade fertilizer, while whatever waste of food there may be is not lost, the waste going to enrich the land.

Supposing a piece of mowing land on which the grass is well up is to be devoted to the little chicks. It should be mowed before they are placed on it, because if left long the chicks would get too wet running through it when the dew is on it in the morning and on wet days; and so it would be necessary to keep them shut in the coops more than is desirable. In respect to chicks running in wet grass it may be said that rugged chicks are not injured by it in ordinary weather, when the sun and air dry them quickly, and when the hen, confined to the coop, keeps dry, and if wet and cold they can go to her and be quickly warmed and dried; but weakly chicks do not stand much wetting, nor can any chicks stand much wetting if they cannot quickly dry themselves after it. Let chicks run when conditions are favorable, at other times keep them confined. When there is so much unfavorable weather that chicks would be shut in too much if this rule were followed, keep coops in the same places long enough to keep the grass short around them, and keep a dish of dry feed — shorts and meal mixed dry will answer — beside the coop, that the chicks may remain near it.

If the plot given to the chicks is convenient to the house the chicks will nearly always get better attention than if it is at a distance, because then the care of the chicks will interfere less with other work. On some farms, where large numbers of chicks are grown, the men do the morning feeding, watering, cleaning and heavier work, and close the coops at night, the women feeding them at intervals through the day. When it is too inconvenient to make several feedings daily, food may be kept by the chicks, but that practice is not to be recommended unless they have a much larger range than indicated by the arrangement of coops suggested.

Ordinarily, coops placed in that way should be moved their own width or a little more daily, until the original position of the next coop in line is reached, then backward or forward the length of the coop, and back toward the original position. Moving this way is done when the coops are opened or closed, and the time taken is scarcely noticed.

The best results in growth and development will be obtained by alternating hard and soft foods. Give a mash in the morning, shorts and meal in equal parts, with a little beef scraps added; a feed of grain, wheat or fine cracked corn about 9 o'clock; mash again at noon; wheat or corn about 4 o'clock, and mash just before dusk. The grain foods may be scattered at the time the mashes preceding them are fed, if conditions are such that the chicks do not soil the grain too much before they eat it. When grain is soiled by their feet, even on quite clean ground or grass, it becomes in a degree poisonous and dangerous to the chicks, just as filthy water is.

To many the idea of feeding whole wheat to little chicks may be novel and seem absurd, but the writer has done it for the last fifteen years, and grown as good chicks and lost as few as when only very fine grain was given early. Chicks start slower on a diet in part of hard grain, but develop better digestive capacity, and later will stand heavier feeding and develop better than those kept too long on soft food. To keep chicks free from lice dust them with insect powder when taken from the nests, then once a week for three or four weeks.

By the time the chicks have outgrown their first piece of ground there should be other places on the farm to which they could be transferred. For the weaned chicks, coops about three feet by six feet, easily moved about, called "roosting coops" by poultrymen, are as good as anything. These may be placed on mowing land after the first crop of grass is off, or at the edge of a corn field where the corn is well started, or a piece of asparagus on which cutting has ceased, or anywhere that the chicks can have room without damaging anything. In general, it may be said that when they can do no damage they always do good. The one most important point in growing chicks is to give them plenty of land room. Many poultry keepers are careful to keep coops scrupulously clean, but are rather indifferent about soiled and contaminated ground. This is not strange, for the great advantage of

a good range is not often apparent except to those who compare the development of chicks on land that looks clean, though it shows the wear of chickens on it, and on land which furnishes more liberal range. After fowls are grown they will stand close confinement, but growing chicks should have room, and if limited for room must have special care to compensate.

The feeding of the chicks after weaning should continue along the line on which they were started. Unless the land furnishes an unusual amount of food, it will pay to keep up the four or five feeds a day, until they begin to be indifferent at some of the feedings. Then omit one feed, — the soft feed at noon. When this point is reached the chickens will get along very well with no attention between the time the hard grain is given them in the morning and the time for feeding it in the evening. At both feedings it should be well scattered, and the evening or afternoon feeding should be several hours before sundown to give them ample time to eat a feed of the scattered grain. Then just before dusk give them all the mash they will eat. They will eat quite a hearty meal of this after they have fed to a surfeit on grain, and will make growth proportionate to the quantity of food eaten.

The methods I have outlined call for nothing expensive in the way of appliances, nor do they call for a great deal of work. There is nothing in the equipment suggested but what any handy farmer can make himself, often from waste lumber or from material purchased at a trifling cost. The prevailing idea is to have things suitable for the purpose to which they are put and convenient for the attendant. This means uniformity in equipment and system in care. By observing these two points, and by studying to keep the chicks as much as possible on land under cultivation or in grass, the farmer can at the same time avoid heavy losses of chicks and greatly increase the poultry-carrying capacity of his farm.

SERIES OF 1907. VOL. 20. NO. 4.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF AUGUST, 1907.

BEE KEEPING.

ISSUED MONTHLY, MAY TO OCTOBER, BY STATE BOARD OF AGRICULTURE, STATE HOUSE, BOSTON, MASS.

J. LEWIS ELLSWORTH, *Secretary.*

ENTERED JUNE 3, 1904, AT BOSTON, MASS., AS SECOND-CLASS MATTER, UNDER ACT OF CONGRESS OF JUNE 6, 1900.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1907.

Approved by

The State Board of Publication.

Crop Report for the Month of August, 1907.

Office of State Board of Agriculture,
Boston, Mass., Sept. 11, 1907.

Bulletin No. 4, Crop Report for the month of August, is herewith presented. Attention is called to the article on "Bee Keeping: Some Suggestions for its Advancement in Massachusetts," by Burton N. Gates, expert on agriculture of the United States Department of Agriculture. The article is in a sense supplementary to that by the same author, on the same subject, issued in 1905, and contains many valuable suggestions for the guidance of those interested in the bee and honey making.

Progress of the Season.

The Crop Reporting Board of the Bureau of Statistics of the Department of Agriculture (Crop Reporter for August, 1907) finds the condition of corn on August 1 to have been 82.8, as compared with 80.9 a month earlier, 88 in 1906, 89 in 1905, and a ten-year average of 83.2.

Preliminary returns indicate the winter wheat crop to be about 409,500,000 bushels, or an average of 14.6 bushels per acre, as compared with 16.7 bushels last year, as finally estimated. The average quality of winter wheat is 90.5. The average condition of spring wheat August 1 was 79.4, as compared with 87.2 a month earlier, 86.9 in 1906, 89.2 in 1905, and a ten-year average of 83.4.

The average condition of the oat crop on August 1 was 75.6, as compared with 81 a month earlier, 82.8 in 1906, 90.8 in 1905 and a ten-year average of 84.9.

The average condition of barley on August 1 was 84.5, against 84.4 a month earlier, 90.3 in 1906, 89.5 in 1905, and a ten-year average of 86.

The average condition of rye at time of harvest was 88.9, as compared with 89.7 a month earlier, 90.8 on August 1, 1906, 92.6 in 1905, and a ten-year average of 88.5.

The acreage of buckwheat is about 778,000, which is 11,500 acres, or 1.5 per cent. less than last year. The average condition of buckwheat August 1 was 91.9, as compared with 93.2 in 1906, 92.6 in 1905, and a ten-year average of 91.8.

The average condition of tobacco on August 1 was 82.8, as compared with 81.3 a month earlier, 87.2 in 1906, 84.1 in 1905, and a five-year average of 83.4.

The average condition of potatoes on August 1 was 88.5, as compared with 90.2 a month earlier, 89 in 1906, 87.2 in 1905, and a ten-year average of 85.8.

Preliminary returns indicate the acreage of hay to be about 42,551,000 acres, or .2 per cent more than last year.

In Massachusetts the average condition of corn was 85; the average condition of oats, 89; the average condition of rye, 95; the acreage of buckwheat, 97, and its average condition, 91; the average condition of tobacco, 88; the average condition of pastures, 91; the acreage of hay, 99; the average condition of timothy, 96; the average condition of clover, 100; the average condition of potatoes, 91; the average condition of Canadian peas, 90; the average condition of beans, 89; the average condition of cabbages, 90; the average condition of onions, 89; the average condition of tomatoes, 87; the average condition of apples, 70; the average condition of peaches, 40; the average condition of blackberries, 85; the product of raspberries, 82; the average condition of cantaloupes and muskmelons, 80.

Temperature and Rainfall for the Whole Country.

[From United States National Weekly Weather Bulletin.]

Week ending August 5. — The weather was unseasonably cool from the middle and northern Rocky Mountain regions eastward to the interior portions of the Middle Atlantic States and New England. On the southern New England and middle and south Atlantic coasts and in the central and east Gulf States the weekly mean temperature differed but slightly from the normal. In south-central Texas and on the north Pacific coast the mean temperature was above the normal. There was more than the usual rainfall in the central and

southern Rocky Mountain regions, Oklahoma, northern Texas, southern Arkansas, northern Louisiana, the lower Missouri, central Mississippi and Red River of the North valleys, northern New England, and over portions of the Lake region and Ohio valley. There was less than the usual rainfall over the greater part of the Lake region and Middle Atlantic and Gulf States, the southern portion of the central valleys and the upper Missouri valley.

Week ending August 12. — The mean temperature was nearly normal in the upper Ohio valley, the Middle and South Atlantic States, southern California and Arizona. It was slightly above normal in the upper Mississippi and lower Ohio valleys, Lake region and New England, and decidedly above normal in the Missouri valley. The week was decidedly cool in the middle and northern Plateau regions and over the greater part of Oregon and Washington. The precipitation was above normal in western Montana, northern Idaho, Washington and the coast regions of Oregon and northern California, throughout the lower Missouri, central Mississippi and lower Ohio valleys, and in the eastern portions of the middle Atlantic coast States. The precipitation was below normal from the upper Missouri and upper Mississippi valleys eastward to the New England coast, in the upper Ohio valley and the interior of the Atlantic coast States.

Week ending August 19. — The mean temperature differed but slightly from the normal in the lower Lake region, Ohio, central Mississippi and lower Missouri valleys, and along the Atlantic, Gulf and Pacific coasts, being slightly deficient in portions of the lower Lake region and Middle Atlantic States, and generally somewhat in excess in the other districts mentioned. In the middle and northern Plateau regions it was considerably below the normal. Heavy rains fell in the lower Missouri, upper Mississippi and lower Ohio valleys, over the western portion of the upper Lake region, and in portions of the Carolinas, Georgia, Alabama, Tennessee, Arkansas and extreme southern Louisiana. There was more than the average precipitation over limited areas in the upper Missouri and the Red River of the North valleys. The precipitation was

below the average in the lower Lake region, upper Ohio valley, Middle Atlantic States and New England.

Week ending August 26. — The mean temperature was above the normal in the Southern States, the excess ranging from 2 to 4. The mean temperatures differed but slightly from the normal in the north Pacific coast States, in the upper Missouri valley and on the immediate middle Atlantic coast. The weather was cooler than usual in the middle Plateau region, central valleys and Lake region, the maximum temperatures, east of the Rocky Mountains, being lowest over the northern portion of the Lake region and on the New England coast. Heavy rains fell in northwestern Texas, northern Arkansas, southern Missouri, southeastern Kansas and the extreme southern portions of Illinois, Indiana and Ohio, and in West Virginia and over considerable portions of the Middle Atlantic States. There was less than the usual rainfall in New England, the lower Lake region, the South Atlantic and east Gulf States, the greater part of Texas and over most of the upper Lake region and upper Mississippi and upper Missouri valleys.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending August 5. — New England. Boston: There was no precipitation, except scattered light showers on the 6th, the amount for the week being much below the normal, except in eastern Maine. Rain is needed, especially in Massachusetts, Rhode Island and Connecticut. The mean temperature was nearly normal, and slightly higher than in the preceding week. The sunshine was above the average.

Week ending August 12. — New England. Boston: The temperature was generally seasonable. The sunshine was above the average, except in the northern portions of New Hampshire and Vermont. Scattered thunderstorms occurred almost daily. The precipitation was deficient, except on the Maine coast and in the upper Connecticut valley. Light showers occurred in Maine on July 30 and 31, and light to copious showers occurred in Vermont, New Hampshire and western Maine on August 1 and 2. A general light rain occurred on the 4th.

Week ending August 19. — New England. Boston: There was no precipitation, except general light showers ranging from inappreciable amounts to .2 inch on the 17th. The temperature was moderate. Light frost occurred in parts of Vermont on the 19th. Rain is needed. The weather continues very dry in Massachusetts, Rhode Island and Connecticut.

Week ending August 26. — New England. Boston: Light showers were general on the 21st and 24th, the precipitation ranging from ½ to ¾ of an inch in southwestern Connecticut and in a few localities in New Hampshire and Maine; elsewhere the rainfall was very light. A heavy rain is greatly needed. The mean temperature was generally seasonable. The sunshine was above the average.

The Weather of August, 1907.

During the first six days of the month there was considerable cloudy weather, with scattered showers and thunderstorms. The rainfall, however, being from showers, was unevenly distributed over the State, some localities having more than .75 of an inch and others less than .30 of an inch. The temperature during the 1st, 2d and 3d was seasonably warm, during the day on these dates rising to between 84° and 88° in nearly all parts of the State. On the 6th, 7th and 8th it was cooler, with temperature ranging between 60° and 80°. From the 7th until the 16th, inclusive, fair and generally clear weather prevailed. From the 7th until the 14th the temperature was high and above the normal, rising above 80° each day. The highest temperature during this period was on the 11th and 12th, when it rose to between 90° and 96° in nearly all sections of the State. This was also the highest temperature of the month. During the remainder of the month moderate temperatures prevailed, with only two or three days above 80°. More cool nights than usual also occurred during the last half of the month, the temperature on the 15th, 16th and 23d falling to between 40° and 45° in many places in the interior of the State. Local showers occurred on the 17th, 21st, 23d and 25th, but, except in the southeast portion of the State on the 24th, the amounts were small and only sufficient to wet the surface of

the ground. The weather for the month as a whole was marked by an absence of cloudiness, an unusual amount of sunshine and a great deficiency in rainfall. Except in a few localities the rainfall for the month was less than 1 inch, making it the driest August, with the exception of 1883, during the past thirty-six years. Although there were less than the usual number of days with a high maximum temperature, the average temperature for the month was somewhat above the normal.

In our circular to correspondents, returnable August 23, the following questions were asked: —

1. What is the condition of Indian corn?
2. What is the prospect for rowen, as compared with a normal crop?
3. What is the prospect for late potatoes, and have you noticed blight or rot?
4. How do the acreage and condition of tobacco compare with former years?
5. What is the prospect for apples, pears, peaches, grapes, quinces and cranberries?
6. What is the condition of pasturage in your vicinity?
7. How have oats and barley compared with former years?
8. Are root crops grown for stock feeding or market in your locality, and, if so, to what extent?

Returns were received from 147 correspondents, from which the following summary has been made: —

Indian Corn.

Indian corn came forward fairly well during the month, and is not as backward as earlier in the season, but a warm September is still essential to its maturing in most localities. It suffered considerably during the month from the dry weather, rolling badly in many sections, and will probably be a light crop, both of grain and stover. Ensilage corn is also backward, and will not be cut as early as usual. Much of the crop originally planted for grain will go into the silo, or be fed to stock to help out the pasture feed.

Rowen.

The rowen crop has suffered extremely from the dry weather, and there will be a very light crop, except on early cut fields on low land. On such fields a fair yield will be obtained, but they are exceptional. The drought has continued too long for there to be much hope of improvement of the crop by future rains.

Late Potatoes.

Some blight has appeared in certain sections, though it is by no means universal. There are no reports of rot from any of the correspondents. The crop is, however, reported as likely to be very light, owing to dry weather. The tubers are said to be small, and not many in a hill, with little prospect of improvement.

Tobacco.

The acreage of tobacco appears to be about the same as last year, which was the greatest reported up to that time. Early fields are said by some correspondents to be in excellent condition, and cutting had begun at time of making returns in some instances. The crop as a whole, however, is backward and unpromising. With warm weather in early September and good rains much development might be looked for even in late fields.

Pasturage.

Pastures are reported as in very poor condition, taking the State as a whole. In eastern sections they are said to be as dry and brown as in winter, and stock must be fed entirely at the barns. The condition in western sections is somewhat better, but even there they are suffering severely from the prolonged drought.

Fruits.

Seldom have the reports on fruit been as discouraging as those just received. Apples are small and backward, have dropped badly, and will not fulfill the modest expectations even of a month ago. The crop will be a light one. The

reports show that there will be practically no peaches and very few pears. Grapes are a fair crop, but not up to the average. Quinces are few and unpromising. Cranberries are reported as not more than half a crop from southeastern sections, having suffered from drought, so that the berries are very small. In the cranberry district there has been practically no rain since early in June, and this long-continued drought has had its effect on cranberries, as well as other crops. Fruits in all sections have suffered from drought, and are generally reported as small in size.

Oats and Barley.

Oats were an average crop, where raised for grain. Barley is little raised for grain, and late-sown fields grown for forage are making little progress, owing to dry weather.

Root Crops.

Root crops are little grown in western sections for any purpose, the silo having supplanted them for stock feeding, and there being little market for them for other purposes. In eastern sections they are grown to a considerable extent by market gardeners and others for the market, but only to a limited degree for stock feeding. On Cape Cod, where turnips are quite a specialty in ordinary years, very few have been sown, owing to the dryness of the ground, and those put in have made but little growth.

NOTES OF CORRESPONDENTS.

(Returned to us August 23.)

BERKSHIRE COUNTY.

New Marlborough (E. W. Rhoades). — Corn is generally thin, but seems to be growing well. Rowen started quickly, but needs rain now. The prospect for potatoes continues good; no blight or rot as yet. Grapes promise a full crop; apples half a crop; other fruits poor. Pastures are in good condition for the time of year. Oats are now being harvested, and are reported extra good; no barley grown. Root crops are not much grown, though a few raise turnips.

Alford (Lester T. Osborne). — Indian corn is backward, and suffering from dry weather. The prospect for rowen is much below the average. Potatoes are suffering from lack of moisture; no blight or rot as yet. Early apples are a good crop, and winter apples promise an average yield. Pasturage is very short. Oats and barley are above average crops. Root crops are not grown for stock feeding or for the market.

Tyringham (Edward H. Slater). — Corn is very backward, but if the frosts hold off until late there will be a fair crop. The dry weather has seriously injured rowen. Late potatoes have suffered for the lack of rain; there is some blight, but no complaint of rot. There will be a light crop of apples and pears. Pastures are very dry. Few root crops are grown for stock feeding, and scarcely any for market.

Lee (A. Bradley). — Indian corn shows a fairly good stand, but is very late. Rowen will be about 70 per cent of a normal crop. There is no blight as yet on potatoes, but the crop has not grown well, and the tubers are small and few in the hill. Apples will not be more than 40 per cent of a full crop, having fallen badly during the last month; pears 20 per cent. Pasturage is 25 per cent below the normal in condition. Oats and barley are three-fourths crops.

Richmond (Timothy B. Salmon). — Indian corn is somewhat backward. Rowen is small and late. Late potatoes are looking well. There is very little fruit, and what there is is small in size. Pastures are short and dry. Oats and barley are normal crops. Root crops are little raised either for stock feeding or the market.

Peru (F. G. Creamer). — Corn is in very good condition. Very little rowen will be cut, because of dry weather. No blight or rot has appeared on potatoes, and they look well. Apples promise a good

yield. Pasturage is very short. Oats and barley are about average crops. Few roots are raised for stock feeding or market. Haying is just finished, with a little above an average crop.

Dalton (Wesley B. Barton). — Indian corn is suffering from dry weather, and will not give over half a crop. Rowen is about 40 per cent of a normal yield. Potatoes promise half a crop, but show neither blight nor rot. Apples and pears are about half crops. Pasturage is very short. Oats and barley are 80 per cent of a normal yield. Root crops are very little grown, ensilage taking their place. The season was favorable to July 15, but there has been very little rain since, so that we are suffering from drought, with wells and springs drying up.

Windsor (Harry A. Ford). — Corn is a month late, and not likely to mature. There will be little rowen, owing to dry weather. There is no blight on potatoes, but early fields are dried up from lack of rain. There will be a light crop of apples. Pastures are very dry. Oats and barley are not cut as yet, being late in ripening. Root crops are little grown.

Cheshire (L. J. Northup). — Indian corn of late has made good progress, but must have September to mature. Rowen cannot be more than 25 per cent of a normal crop. Late potatoes will be a very light crop unless rain comes soon. The prospect for fruit is not at all flattering. Pastures are dried up, except in moist places. Oats are not a full crop; there is but little barley raised. There are some root crops grown for stock and market, but not to any great extent.

FRANKLIN COUNTY.

Monroe (David H. Sherman). — Indian corn is late, and but little was planted. Owing to dry weather, the rowen crop will be very light. There is no rot on potatoes, but some fields have blighted; most fields look well. Apples are small and late, with pears the same. Pastures are in average condition. Oats and barley are all cut for forage, and are fair crops. Root crops are but little grown.

Rowe (N. E. Adams). — Corn is very backward and uneven. Rowen will be about half a crop. Potatoes promise to be rather less than an average crop, but there is no blight or rot as yet. The prospect is poor for all kinds of fruits. Pasturage is in fair condition, as good as usual at this time of year. Oats and barley are about average crops. Beets are grown for stock feeding to a small extent, but are very late.

Gill (F. E. Stoughton). — Corn is of good color and growing fast, but is late. There will be only a light crop of rowen, owing to drought. Fruits of all kinds will give light yields. Pastures were in good condition, but are now suffering from drought. Oats and barley are not very good crops. Root crops are little grown.

Deerfield (D. A. Hawkes). — Indian corn is much below an average crop. The prospect for rowen is bad. Potatoes promise a good crop, though blight is just appearing. There is a small increase in the acre-

age of tobacco, and it is in poor condition. Apples are half a crop; no other fruits except grapes. Pastures are suffering from drought. Oats are a good crop; no barley grown. Root crops are not grown for stock feeding or the market.

Whately (Clifford L. Crafts). — Indian corn looks yellow, and is backward. There will be very little rowen. Late potatoes look well, with no blight or rot. The acreage of tobacco is about the same as usual, and the crop is mostly in better condition than usual. There will be a very small crop of all kinds of fruit. Pasturage is in good condition. Oats and barley are about average crops. The extremely dry weather of the past month has injured many crops, but if rain would come now rowen would probably grow.

Sunderland (Geo. P. Smith). — Corn is about normal in growth and time of ripening. Rowen is good on heavy soils, and is drying up on light soils. Late potatoes promise better than average yield, with little blight or rot. The early fields of tobacco are about an average, but some late-set fields are very small; harvesting has commenced. Onions are a much better crop than for two years past; a few early ones are being marketed at 75 cents per bushel. There will be light crops of all fruits except grapes. Pasturage is in fair condition, but is rather short and needs rain. Oats and barley are not grown. Root crops are grown only by a few market gardeners to supply their own trade.

Montague. — Indian corn is in good condition, though some fields are late. Clover is a good crop; other rowen rather short. Late potatoes promise a very fair yield; little blight and no rot. There is about the usual acreage of tobacco, and some of it is in better condition than usual. Apples are half a crop; few pears; no peaches or quinces; some grapes, but quite late. Pasturage is very short now. Oats and barley are not very good crops. Root crops are very little grown.

Northfield (T. R. Callender). — Corn is in fair condition, but about a week or ten days late. The rowen crop will be below the average. Potato vines look well, but some early blight is noticed. There is about the usual acreage of tobacco; the crop looks well, though late. There will be a small crop of apples. Pastures are in need of rain. Oats are a good crop, fully up to the average; no barley grown. Root crops are not grown for stock feeding or market.

Orange (A. C. White). — All that is wanted for a normal crop of corn is time for it to mature. The dry weather will make the rowen crop very light. Late potatoes promise only a light yield. Apples are not quite a normal crop. Pasturage is in very poor condition. Oats and barley are normal crops.

HAMPSHIRE COUNTY.

Prescott (W. F. Wendermuth). — Indian corn has been doing well lately and there is the promise of a fair crop. The prospect for rowen is very poor, owing to lack of rain. There is no blight or rot as yet, and a good crop of potatoes is in prospect. Apples are a good crop for an off year; pears and grapes good; no other fruits. Pastures are badly dried up. Oats and barley are fully up to the average. Root crops are not grown to any extent. The needles on many of the white pine trees are turning brown, and the trees appear to be dying.

Enfield (D. O. Chickering). — Corn is in good condition, but a little late. Rowen will be a light crop, on account of dry weather. The prospect is good for a heavy crop of potatoes, with no blight or rot as yet. The prospect is for a very light crop of fruit; cranberries good. Pasturage is in very poor condition; badly dried up. Oats and barley are not raised except for forage. Root crops are but little grown.

Belchertown (H. C. West). — The drought has curled some fields of corn, but on the whole a full average crop is in prospect. There will be little or no rowen. There is no blight to speak of, and no rot on potatoes, and a fair crop in prospect. Apples will be a two-thirds crop; few pears; no peaches, quinces or cranberries. Pastures are very short, owing to extremely dry weather. Oats and barley are fully up to the average. Root crops are little grown.

Hadley (H. C. Russell). — Indian corn is very late. There will be only a light crop of rowen. Blight has struck potatoes to a certain extent. There is a slight increase in acreage of tobacco, but it is below average in condition. There is a small crop of all fruits in prospect. Pastures are dry. Oats and barley gave average yields. Tobacco harvest has begun. Dry weather has affected all crops, and average results cannot now be expected. Root crops are not grown for stock feeding or market.

Hatfield (Thaddeus Graves). — Indian corn is ten days late. Dry weather has injured the rowen crop 30 per cent. The potato crop is injured by drought; no blight to date. The acreage of tobacco is about as usual, but the crop is 20 per cent below the average in condition. There will be light yields of fruit. Pasturage needs rain badly. Oats and barley are little raised. Root crops are not grown. A good rain of two days is badly needed.

Easthampton (Wm. C. Clapp). — Indian corn is late, and not earing well on light land; is also badly in need of rain. There will be a light crop of rowen. The prospect for potatoes is poor, owing to lack of moisture. There is a full acreage of tobacco, and it is of good color. There will be from one-fourth to one-third of a crop of apples; no pears, peaches, quinces or cranberries. Oats are up to the normal; not much barley is raised, millet being grown instead. Pastures are dried up except on moist land. Root crops are not grown to any extent.

Southampton (C. B. Lyman). — Corn has made a good growth, but on many fields is rolling for want of moisture. Not much rowen will be cut unless we have rain soon. Late potatoes are looking fairly well, but are beginning to suffer for want of rain. There is a normal acreage of tobacco, but, like all crops, it needs rain. Apples will give a small yield. Pastures are very dry. But few oats grown, and no barley. Root crops are little grown.

Goshen (Alvan Barrus). — First cold and wet weather and then hot and very dry weather make the prospects for the corn crop dubious. Rowen is not very promising. There is no blight on potatoes, but there will not be more than half a crop, because of drought. There will be far from a full crop of fruit. Pastures are drying up, as a rule. Oats and barley are fair average crops. Root crops are not extensively raised. The streams have never been so low as at present.

Middlefield (John T. Bryan). — Indian corn is about three weeks late, but doing well at present. The rowen crop will be light, owing to dry weather. Late potatoes are free from blight. There are no pears, but other fruits are abundant. Pastures are suffering from drought. Oats and barley are full crops. Very few roots crop are grown.

HAMPDEN COUNTY.

Blandford (Enos W. Boise). — Corn is in poor condition, as the leaves are curling and the crop drying up. No rowen is growing on even early cut land. Potatoes are still green, but the yield will be very light. Some orchards show a fair amount of apples on the trees. Pastures are all short, and there is a shortage of water for stock in many of them. Oats and barley are 80 per cent of normal crops. Root crops are grown to but small extent. Stock in pastures must soon be fed from the barn.

Southwick (Luzerne A. Fowler). — Indian corn has been injured by drought. There will be little or no rowen. Potatoes are ruined by dry weather, as the rain came too late to save them. Hail and dry weather have injured tobacco 50 per cent. Fruit is almost a failure. Pasturage is very dry. The rain of the 24th will benefit late tobacco and new-seeded fields. Tobacco cutting has begun. Root crops are not grown to any extent, and have suffered with other crops from want of rain.

West Springfield (N. T. Smith). — Corn is in good condition on the river lands, but late on the uplands and badly dried up. There is no rowen except on the river lands and low-lying, moist fields, and it is very light on these. There is a very discouraging prospect for potatoes; no rot, but some blight. There is a small increase in the acreage of tobacco, but it is below average in condition, and late. Very few apples and pears; no peaches; grapes good; no quinces. Pasturage is entirely dried up except on some low lands, and is very short there. Oats and barley are grown for fodder only, and are about 80 per cent of

the normal in yield. Root crops are grown in limited quantities for stock feeding, mostly turnips and mangolds; and quite considerably for market, beets, carrots, parsnips and turnips.

Agawam (J. G. Burt). — Indian corn is suffering for want of rain. There is no rowen, as it has dried up. The prospect for late potatoes is good; no blight or rot. The acreage of tobacco is about as usual, but it is in need of rain. The prospect is for a light crop of all fruits. Pasturage is short. Oats and barley are about average crops. A few root crops are raised, but not to any extent.

East Longmeadow (John L. Davis). — Corn is turning yellow, and the soil is too dry for it to ear out. There is no rowen at all. There is not much blight on potatoes, and no rot, but it is too dry for the tubers to grow. Apples are a one-fourth crop; no pears or peaches; few grapes; some cranberries. Pasturage is all dried up. Oats and barley are about two-thirds crops. Turnips are raised by most stock farmers, but are in need of rain.

Hampden (John N. Isham). — Indian corn has made a good growth, and is earing well. There will not be half of the usual crop of rowen. Drought will lessen the potato crop; no late blight or rot. Apples half a crop; other fruits light. Pastures are getting short, and in many spots look dry and brown. Oats are a good crop. Comparatively few root crops are grown, and all are used for feed.

Wilbraham (H. M. Bliss). — Indian corn is in fair condition. Rowen will be 70 per cent of a normal crop. Late potatoes will be light, and there is some blight. Apples and pears are three-fourths crops; grapes fair; quinces three-fourths; cranberries light; no peaches. Pastures are in very poor condition. Oats and barley are fair crops. Root crops are little raised. Cows are shrinking badly, although fed with hay and grain.

Monson (F. D. Rogers). — Corn is late, but in fairly good condition. There is only a poor crop of rowen in sight. The crop of potatoes will be very light unless rain comes soon; some blight in spots. Apples and pears are a light crop; no peaches; grapes fair. Pasturage is very short. Oats are a good crop. Root crops are not grown as much as they should be.

Palmer (O. P. Allen). — Indian corn is in very good condition, but later than usual. The recent dry weather will cause the rowen crop to be a little less than normal. The prospect for late potatoes is quite good, and they are little affected by blight or rot. There is a fair crop of apples; grapes normal; very few pears; no peaches; few quinces. Pasturage is badly affected by drought. Oats and barley are about average yields. Root crops are grown to a limited extent. Crops have generally been looking well, but are beginning to suffer for lack of rain.

WORCESTER COUNTY.

Dudley (J. J. Gilles). — Indian corn is much affected by drought. The prospect for the rowen crop is very slim. There is no blight or rot on potatoes, and but few potatoes. There will be a fair crop of apples, pears and cranberries. Pastures are dry and parched. Turnips are grown to a limited extent.

Brookfield (Frank E. Prouty). — The dry weather has injured the corn crop considerably. But little rowen will be cut. The potato crop will be small, on account of drought; no blight or rot. Pasturage is all dried up. Oats and barley are good crops. Turnips are raised to some extent, but there will be but few this year. No peaches or cranberries; some grapes; pears about half a crop; apples not over half a crop; all injured by dry weather.

West Brookfield (Myron A. Richardson). — Indian corn is late, but looking finely, though rolling from drought. If the dry weather continues, there will not be any rowen. No blight or rot has as yet made an appearance on potatoes. Pastures are all scorched and burned up, and some have been obliged to take out cattle on account of shortage of water. Barley has done finely this year, also oats, except that now and then a field has suffered from rust.

Oakham (Jesse Allen). — Indian corn is suffering from drought. Rowen is an entire failure. The prospect for late potatoes is poor, but there is no blight or rot. There will be very light yields of all fruits, because of drought. Pastures are very badly dried up. Oats and barley are average crops. Root crops are not raised. Because of drought the milk supply is very short.

Petersham (B. W. Spooner). — Corn is backward, but making good growth this warm weather. Unless there is more favorable weather soon, the rowen crop will be light. There is no rot on potatoes, but dry weather has lessened the yield. There is not half a crop of fruit in this vicinity. Pasturage is drying up very rapidly, and cows are shrinking fast. Root crops are little raised. There is considerable alarm here about the pines dying or the needles turning red, more particularly on the scattered cabbage pines.

Phillipston (A. D. Clifford). — Indian corn is very backward. The rowen crop is below the average. Late potatoes are suffering from dry weather; no blight as yet. Apples, pears and peaches will give light yields; other fruits not much raised. Pastures are all drying up. Oats and barley are average crops, but mostly grown for forage. A small amount of root crops are grown for market.

Templeton (Lucien Gove). — Indian corn is rather backward, and suffering for lack of rain. Rowen is very poor, and fields are turning brown. Late potatoes do not promise a full crop, being affected by drought. Apples will be a light crop; pears light; no peaches; grapes good; no quinces or cranberries. Pasturage is very poor, from lack of

rain. Oats and barley are fair average crops. Root crops are grown to a limited extent. Crops of all kinds are suffering from lack of rain, and the season is backward.

Royalston (C. A. Stimson). — Indian corn is looking better than earlier, and will give a fair crop. There will be a short crop of rowen. No potatoes have been dug as yet, and blight has attacked them. There will be short crops of all fruits. The dry weather makes pasturage poor. Oats and barley are not up to normal crops. Root crops are not grown for stock feeding or for market.

Westminster (Alden J. Foskett). — On account of the late spring and continued drought corn will be a light crop. There will be but little rowen cut this year. Late potatoes are ripening before they are grown. There will be only a small crop of apples. Pasturage has been very good, but is now drying up badly. Oats and barley are about normal crops. Root crops are not grown for stock feeding or the market. There was less than the average amount of rainfall in the spring, and it has been a very dry summer.

Princeton (A. O. Tyler). — Indian corn is backward and suffering from dry weather, but would be saved by rain. There is no rowen, owing to dry weather. Dry weather is doing great damage to potatoes; some blight, no rot. There is a small crop of apples; no pears, peaches, grapes, quinces or cranberries. Pasturage is all dried up. Oats are all cut for fodder, and are a fair crop; no barley raised. Root crops are not grown to any extent.

Sterling (Henry S. Sawyer). — Indian corn is very backward, and many fields are suffering from drought. Rowen is about half a normal crop. Some fields of potatoes are suffering for rain; no rot noticed. The drought is affecting all fruits more or less. Pastures are very dry, and the amount of feed small. Oats and barley are about normal crops. Root crops are grown for home use and for market, but not to any great extent for the latter.

Bolton (H. F. Haynes). — Corn is late, and on light land nearly ruined by drought. The prospect for rowen is very poor, it is so dry. Late potatoes look well, with no blight or rot, but it is too dry to expect much of a crop. Few apples; no peaches. Pastures are all dried up. Oats and barley are all cut green for hay and forage. Root crops are not much grown.

Northborough (John K. Mills). — Owing to dry weather, corn has not grown, and unless we have rain soon the crop will be light. There will not be half a crop of rowen. The outlook for potatoes is not very promising; no blight or rot as yet. There will not be half a crop of any fruit. Pastures are very short, and some of them completely dried up. Oats and barley are good average crops. Roots are grown quite extensively for market, and all culls are used for feeding.

Shrewsbury (F. J. Reed). — Indian corn is very poor, owing to dry weather. There will be no rowen, as it is all dried up. There will be

very few late potatoes, owing to dry weather. There will be a very light yield of all fruits. Pasturage is all dried up. Oats and barley have stopped growing, because of drought. Root crops are grown for market quite largely.

Auburn (Wm. Gilbert). — Indian corn is a very slim crop. There will be no rowen. Late potatoes are very good, and I have noticed no blight or rot. Fruit is going to be very scarce. Pastures are all dried up. Oats and barley are very good crops this year. Root crops are not grown around here.

Blackstone (O. F. Fuller). — The condition of Indian corn is not very good, on account of dry weather. There will not be one-third of a crop of rowen. Potatoes are suffering from dry weather. There will be few apples and pears; cranberries and grapes are good crops. Pasturage is in very poor condition. Very little oats and barley are raised except for fodder. Roots are raised more for market than for stock feeding.

MIDDLESEX COUNTY.

Hopkinton (W. V. Thompson). — Indian corn is suffering from the extremely dry weather. There is not any rowen. Unless we have rain soon, the crop of late potatoes will be a failure. There will be but few apples, pears or grapes, and no peaches. Pastures are dried up. Oats and barley made poor yields. Root crops are not grown for market or for stock feeding.

Marlborough (E. D. Howe). — Indian corn is curling from dry weather. The prospect for the rowen crop is very poor, not 25 per cent of a full crop. The prospect for potatoes is fair; no blight as yet. Apples and pears 40 per cent of an average yield; no peaches; grapes 90 per cent; quinces 10 per cent. Pastures are all burned up. Oats and barley are 90 per cent of average crops. Root crops are not raised for stock feeding or for market.

Maynard (L. H. Maynard). — Corn is in poor condition, except on low lands, where it will be an average crop. Rowen will be extremely short, owing to drought. Potatoes will be a short crop, and very small; no blight or rot as yet. Apples will be short, and are dropping fast; pears and peaches short; quinces about average; no cranberries grown. Pastures are suffering for want of rain, and the feed is very short. Oats are nearly all cut green, and the crop was an average one. Root crops are grown mostly for market, and are average yields. Turnips are the only root crop grown to any extent for stock feeding, and the crop will be short.

Littleton (Geo. W. Sanderson). — Indian corn promises a large crop, but most of it will go into the silo. Rowen is good on new fields, on others not quite normal. Recent dry weather has had an unfavorable effect on potatoes, the vines on many fields showing blight. Apples poor; pears fair; no peaches; grapes, quinces and cranberries

not up to normal. Pastures are extremely dry. Oats and barley compare favorably with other years. A few farmers grow ruta-bagas and mangolds for stock, but few are cultivated for market.

Pepperell (W. F. Dennen). — Corn is very promising, but is drying badly. Rowen is not a good crop. Potatoes look fairly well, with no blight as yet. There will be a light crop of all fruits. Pastures are very dry. Oats and barley are about average crops.

Dunstable (A. J. Gilson). — Indian corn is in fair condition, considering the extreme dry weather. Rowen will be below a normal crop. Late potatoes will be light unless rain comes soon; no blight or rot noticed. The prospect is that all kinds of fruit will be scarce and of poor quality. Pasturage is nearly all dried up in this vicinity. Oats and barley compare favorably with former years. Root crops are not much grown in this locality.

Westford (J. W. Fletcher). — Corn is looking badly, owing to dry weather. Rowen will be late and light. Potatoes are all dried up. Apples promise a good crop. Pasturage is in poor condition, owing to dry weather.

Billerica (Geo. P. Greenwood). — Corn is drying up. There will be very little rowen. Very few late potatoes are grown about here; have seen no blight. There is absolutely no fruit of any kind. Pastures are very dry. Root crops are little grown for stock feeding or market.

Concord (Wm. H. Hunt). — Corn is growing rapidly. Rowen will be very light, on account of the drought. Potatoes are suffering from drought, especially on light land. Apples and pears are light; no peaches; other fruits medium. Pasturage is at present suffering from drought. Oats and barley are average crops. Root crops are grown to a considerable extent for market. Turnips are grown extensively and sent to market when the price will warrant, being fed to stock when low in price.

Wakefield (Chas. Talbot). — Indian corn is curling badly. Dry weather has about used the rowen up. No rot or blight on potatoes, but the lack of rain means a small crop. There will be some apples; pears and grapes plenty; cranberries small crop. Pasturage is very poor except on low land. Oats and barley are about normal crops. Very few root crops are used here. Cabbages have grown finely, but owing to dry weather do not head up well.

Winchester (S. S. Symmes). — Indian corn is not raised. There will be no rowen at all unless rains come very soon. There is no rot on potatoes, but the crop is nearly dried up. There will be a light crop of apples and pears; no peaches or quinces. Pasturage is totally dried up, and there is absolutely no feed in the pastures. Root crops are grown for market extensively. This season bids fair to be the very worst on record for most crops in this vicinity. The season is so far advanced that rain cannot help some crops.

Arlington (W. W. Rawson). — All crops are very poor, on account of dry weather.

Weston (Henry L. Brown). — There will be no rowen. There is no blight or rot on potatoes, but it is too dry for them to grow. There are few apples and pears; no peaches; grapes and quinces not grown to any extent, and no cranberries. There is no feed in the pastures. Oats and barley are only grown for forage, and gave a fair crop. Mangolds and turnips are grown for stock. It has been so dry that many crops are almost failures.

ESSEX COUNTY.

Amesbury (F. W. Sargent). — Although late in starting, corn is now nearly up to date, but is suffering from drought. Prospects for rowen poor, except on moist land that was cut early. Potatoes are likely to be small in size; no blight as yet. There will be very light crops of all fruits; no peaches. Pasturage has recently dried up, and brooks are low or dry. Oats and barley are raised only for hay, but are average crops. Root crops are not grown for stock feeding or market, owing to cost of labor.

Haverhill (Ebenezer Webster). — Indian corn is good except on very dry ground. Rowen is not quite up to the normal, on account of drought. Late potatoes are looking well. Apples will be a one-fourth crop; pears few; peaches none; grapes normal. Pasturage is rather light, on account of drought. Root crops are grown for stock feeding and market to a small extent.

North Andover (Peter Holt). — Corn fodder fair; grain light. Rowen is very light except where land is in a high state of cultivation, and the first crop was cut early. Potatoes will be a very light crop, as few tubers have formed. Apples are very light; pears good; peaches none; grapes good. Pastures are very much in need of rain. Oats and barley have been average crops. Root crops are not grown.

Topsfield (B. P. Pike). — Indian corn is not quite up to the average. Rowen is a very poor crop, not over 25 per cent of the normal. Potatoes are a failure on light soils; no rot as yet. Apples are not over one-fourth of a crop; pears the same; no peaches. Pasturage is very poor. Oats and barley are fair crops. Root crops are not much grown for stock feeding or market.

Wenham (N. P. Perkins). — Indian corn is not much raised. Rowen will be not half a crop. There will be a fair crop of potatoes; have noticed neither blight nor rot. There will be about half a crop of winter apples, but little of other fruits. Pastures are quite short, and cows are fed largely at the barn. Oats and barley are not raised except for fodder. Root crops are grown largely for market, but not much for stock feeding. Onions are already dropping considerably. Sweet corn on dry land is suffering badly, and will be a light crop.

Danvers (Chas. H. Preston). — Corn is a good crop locally. Rowen will be a very light crop. There will be a light crop of potatoes; no blight or rot. Apples, pears and peaches are poor crops; grapes good. Pasturage is in poor condition. Root crops are very little grown. We seem to have suffered less than most localities from drought, but crops are beginning to feel it.

NORFOLK COUNTY.

Cohasset (Ellery C. Bates). — Indian corn is not raised. Rowen will be a very light crop. There will be a small crop of late potatoes; no blight or rot at present. There will be a small crop of all fruits. Pasturage is in poor condition. Oats and barley are not raised. Root crops are not raised for stock feeding or market. We have had no rain of any account since June 8.

Stoughton (Charles F. Curtis). — Corn is so badly hurt by the continued drought as to be only one-third of a normal crop. There will be no rowen. Both late and early potatoes are a failure, and show some blight. Apples one-third of a crop; pears 10 per cent; no peaches; grapes 80 per cent; quinces and cranberries half crops. Pasturage is all burned up. Oats and barley are grown as green feed mostly. Farmers are feeding hay to their cows to keep the milk yield from shrinking too much.

Canton (E. V. Kinsley). — Indian corn is suffering from drought, and will be a short crop. There is no rowen anywhere. Potatoes are very poor, half a crop, perhaps; no rot as yet. There is a very short crop of all fruits, though some early apples are full. Pastures are dried up, and contain no feed whatever. Oats and barley are less than average crops. Root crops are not grown to any considerable extent.

Norwood (Frank A. Fales). — Corn is in poor condition, about three weeks late and about half a crop. There will be no rowen. There will be a very small crop of potatoes; no rot as yet. There will be 25 per cent of a crop of apples; very few pears; no peaches or grapes. Pastures are all dried up, and most farmers are feeding at the barn. Early oats did well; late oats and barley very light. Root crops are not grown to any extent.

Millis (E. F. Richardson). — Corn is drying up. There will be no rowen. Potatoes will be a very light crop. There will be very light yields of all fruits. Pasturage is all dried up. Early oats and barley good; late crops minus. Roots crop are little raised this year.

Franklin (C. M. Allen). — The weather is too dry for a full crop of Indian corn. There will not be more than one-fourth of an average crop of rowen. There will probably be a three-fourths crop of potatoes. There are very few apples; few pears; no peaches; grapes half a crop. Pasturage is all dried up. Oats and barley are average crops. Root crops are little grown, either for stock feeding or for market.

BRISTOL COUNTY.

Attleborough (Isaac Alger). — Indian corn is in poor condition, owing to dry weather. There will be no rowen. The potato crop will be very small unless we have rain soon. There are no apples, pears or peaches, and only small crops of quinces, grapes and cranberries. Pasturage is very poor, all dried up. Oats and barley are average crops. Root crops are grown for stock feeding, but not very largely for market.

Rehoboth (Adin B. Horton). — Corn is not over half a crop. There is no rowen. Potatoes promise about half a crop; no blight as yet. Apples and pears are not over one-fourth crops; no peaches; grapes half a crop. There is hardly any feed in the pastures. Oats are about a three-fourths crop; no barley grown. There is a small amount of roots raised for feeding stock, and they are raised to a considerable extent for market.

Seekonk (John W. Peck). — Most fields of corn have rolled badly, and even with rain the prospect is that the crop is too backward to mature. On some very low lands there will be one-third of a crop of rowen. There will be a small yield of potatoes, owing to drought; no blight. Apples, peaches and quinces very scarce and poor; pears, grapes and cranberries half crops. Pasturage on high lands is all burned up. Oats and barley are good crops. Some mangels are raised for feeding to cattle and hogs. Late beets, French turnips, carrots and parsnips have been grown for market to some extent. Early root crops were good in quantity and price; late ones nearly a complete failure, owing to severe drought.

Berkley (Rollin H. Babbitt). — Indian corn is suffering severely for want of rain. There will be very little if any rowen in this locality. The outlook is for a light crop of potatoes; tubers small and tops dying. Apples are a light crop; pears few; no peaches; quinces few; cranberries many, but small. Pasturage is all drying up. Oats and barley are less than average crops. Root crops are not much raised for stock feeding, being mostly used for market. Hay will be high, as we have no second crop, and the weather has been unfavorable for sowing forage crops.

Swansea (F. G. Arnold). — Much corn will not ear, as we have had no rain for weeks. No rowen will be cut, owing to dry weather. There is no rot on potatoes, but the crop will be light, on account of drought. There are few apples; no peaches and few grapes. Pastures are all dried up, and farmers are feeding hay. Oats were an average crop, but mostly cut for feed. Root crops are not grown to any extent; a few beets and turnips only.

Dartmouth (L. T. Davis). — Indian corn is growing slowly, but with no frost for a month will ripen well. There is no prospect of any amount of rowen. Potatoes look fairly well, with little sign of blight. There will be a light yield of all fruits. Pastures are very poor, and

there is little feed on mowings. Oats and barley are about normal crops. Root crops are grown to a limited extent, both for stock feeding and market.

PLYMOUTH COUNTY.

Norwell (Henry A. Turner). — Indian corn is late, but good. There will be very little rowen unless rain comes soon. There is very little blight or rot on potatoes. Apples promise about half a crop; grapes good. Pasturage is drying up. Oats and barley are about normal crops. Root crops are not much grown either for stock feeding or market.

Pembroke (Nathaniel Morton). — Indian corn is in very poor condition, owing to drought. There is no rowen whatever, except on very low ground. There is a prospect of only a light crop of potatoes, but neither blight nor rot has appeared. Fruits are light in yield, cranberries being best, but impaired by dry weather. Pasturage is dried up. Oats and barley are less than average crops. Root crops are little grown.

Kingston (George L. Churchill). — Indian corn is growing fairly well. Rowen will only be a very small crop. As it looks now, there will be but a small crop of potatoes, although there is no blight. There are very few apples and pears; no peaches; cranberries a small crop. Pasturage is very poor, on account of drought. Oats and barley were very light crops. Root crops are looking very poorly.

Carver (J. A. Vaughan). — The rowen crop will be poor. Potatoes have been cut short in yield for want of rain. There is but little fruit of any kind, except cranberries, and they are suffering from drought. Pastures are dried up. But few root crops are grown here. Except one small shower, there has been no rain since Sunday, August 4, and but little rain since June 10. All crops are suffering.

Lakeville (Nathaniel G. Staples). — Indian corn is in fair condition. There will be no rowen of any account. There is a poor prospect for potatoes, though there is very little blight and no rot as yet. There is no fruit except grapes, which are quite plenty. Oats and barley are not up to average crops. Root crops are little grown for stock feeding or market. There has been no rain of any account since June 1, and crops have suffered accordingly.

Mattapoisett (E. C. Stetson). — Indian corn is in poor condition. There is very little rowen this season. Late potatoes are looking quite well, with very little blight or rot. There are very few apples and pears; few peaches or grapes; cranberries good. Pasturage is poor and very dry. Oats and barley are about average crops. Root crops are grown to a small extent.

BARNSTABLE COUNTY.

Bourne (David D. Nye). — Indian corn is very small and backward. The prospect for the rowen crop is very poor at present, owing to drought. Potatoes are nearly a failure, because of dry weather. Cran-

berries are about half a crop; other fruits very light. Pastures never looked so barren, every spear of grass being as dry as possible. Oats and barley are fair crops where sown early. Root crops are little raised, and do not promise well.

Sandwich (R. F. Armstrong). — Indian corn is backward. There is no rowen in this vicinity. Have noticed neither blight nor rot on potatoes, but the prospect for the crop is not good. There will be a fair crop of apples, though they are small and dropping badly. There is no pasturage, and milch cows are being fed in the barn. There was a fair crop of oats, mostly cut for hay; no barley grown.

Barnstable (John Bursley). — Corn is looking very light indeed, and much of it will be cut and fed during the next two weeks. There is not a forkful of rowen to cut. Late potatoes will be a very light crop, but there is no blight or rot. Apples will be very light; no pears or peaches; grapes and cranberries fair, though cranberries on most bogs are very small. There is no pasturage; all milch cows are fed at the barn, as in winter, while young cattle are feeding on brush and swamp bog grass. Oats were one-third of a crop; no barley grown. Cape turnips are usually grown for market, but the drought has prevented their being sown. With the exception of a light rain August 4, we have not had even a light shower since early in June.

Dennis (Joshua Crowell). — Indian corn is unsatisfactory, and the prospect is very discouraging. There is no rowen. The potato crop will be small. There are a few apples; grapes are a fair crop; other fruits small yields. Pasturage is almost completely dried up. Root crops are grown to some extent. Cranberries, which were very promising early in the season, will not yield one-third of a crop in this vicinity.

Eastham (J. A. Clark). — Nothing doing; drought continues, and all crops are at a standstill.

Truro (John B. Dyer). — Indian corn is very little raised. There is no prospect of any rowen at present, owing to dry weather. Upland farming is nearly a failure, including potatoes. Apples and pears promise only poor crops; grapes and cranberries fair. Pastures are exceedingly dry. Oats and barley are not grown here. Root crops are not grown to any great extent. Beets and turnips are ordinarily raised to some extent, but this year, being so very dry, will be nearly or quite a failure. Since the first of June only light showers have fallen.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — Corn is in good condition. The prospect for the rowen crop is poor. Potatoes have been damaged by drought; very little blight or rot. There is a poor prospect for all kinds of fruit. Pasturage is dry. Oats and barley were small crops. Root crops are not grown to any great extent.

BULLETIN OF

MASSACHUSETTS BOARD OF AGRICULTURE.

BEE KEEPING: SOME SUGGESTIONS FOR ITS ADVANCEMENT IN MASSACHUSETTS.

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Apiculture is proverbially regarded as the poetry of agriculture. Of agriculture George Washington said: "It is the most noble industry of man." We would therefore flatter ourselves in being fortunately interested in an art worthy of the most strenuous efforts to advance it.

As a business proposition, notwithstanding the general belief that the business end (of the bee) is not worth while, we have evidence from all thrifty bee keepers, on all sides and in all States, that keeping bees pays. Not a little care is necessary, and this attention is imperative at just the right moment; but on the investment the interest is great.

Some have considered that bee keeping has had its day; true, the old style. We have done with the box hive and with honey strained through an old body-blanket, as the Indian used to do. We have found that the crops can be increased, the ease of procuring them increased and the profits advanced, by modern manipulation.

Awakening, renascence, rejuvenation, modern-method progress, larger crops and better prices symbolize bee keeping to-day. Massachusetts is no exception; she responds to the stimulus with the world as a whole. But as yet the response is not general; it is noticeable only here and there, as some one is having his eyes opened to the fact that several times the old returns from a colony of bees are possible under modern manipulation. Furthermore, we must better realize the unquestionably good resources in this State, which are constantly going to waste. We believe it possible for bee keeping in Massachusetts to rival that of any of the northeastern States; in order to do it, however, we must first become acquainted with the resources of the State, with modern manipulation, and then spread wide the news among all bee keepers.

Before we consider how to better the existing bee industry, and before discussing the natural conditions for the industry in this State, we may well observe what a few have demonstrated *can* be done with bees by no more than a little judicious manipulation.

What can be accomplished.

The following observations were made from returns to a series of questions sent to the members of the Worcester County Bee Keepers' Association. A similar set of questions was also reported in the previous year, to which reference will also be made. These comparative results figured on the crop of 1905 and 1906 are merely an index of what can be done with bees by those who know how and who are willing to give the attention; they do not in any degree represent the status of the industry as a whole.

The observations are based on the work of but 38 bee keepers, who had, in the spring of 1906, 359 colonies, and who increased to 527 colonies in the fall, or an increase of more than 50 per cent. More remarkable still, there was a significant honey crop along with this increase of bees. Of comb honey we are reported 10,117 pounds; of extracted or strained, 6,098 pounds; or a total of 16,215 pounds, which is equivalent to nearly $8\frac{1}{4}$ tons. Consider this, a season's work of only 38 unpretentious kee keepers, who have three or four to a few dozen hives, and who keep bees only that they may supply a limited local trade or their own tables, or, as one man tells us, because "I like to have the industrious fellows around." It is no record to be ashamed of; is it not a cheerful index to what can be done in the State?

Summarizing, we find that the average yield was 45 pounds per colony, spring count. As compared with the previous season, 1905, this was 10 pounds better per colony. Now to compare with the figures of the United States census for 1900, which puts the yield for Massachusetts at 13 pounds per colony. These census figures are generally considered as unsignificant and not well founded, but nevertheless they go the world over, representing the State's capabilities. According to our figures, they are at least 32 pounds per colony out from a reasonable average. Furthermore, these 38 bee keepers set a higher standard than the census report for the famous honey-producing State of California, which we are told averaged 28 pounds per colony. The same objection is also pertinent here, as in the census figure for Massachusetts, but will nevertheless permit of just comparison with our society's returns.

We realize most assuredly that on so few returns as 38 out of several thousand possible bee keepers in the State, it is not safe to place too much emphasis and significance. We may, however, especially since we know personally most of those who made these returns, know their methods and know their purposes in keeping bees, say that these figures reveal more correctly than the census report, for instance, the truly existing circumstances and possibilities in Massachusetts. They represent what is possible for every one who has bees and who is willing to learn how to manipulate them, which, by the way, is as much easier than the shiftless, let-alone bee keeping as to live neatly is easier than to live slovenly.

It is not the purpose of this paper to tell how to keep bees, and it is far from the purpose to stimulate and prompt new bee keepers; but it is rather to stimulate those who now possess bees, to keep them better.

We hope also to encourage our readers by possibly indicating to them the superior resources of the State, and to suggest to them some immediate steps which will help them to become better bee keepers.

With this index of what is possible, and a prospect of doing better bee keeping, in mind, let us consider, before regarding the essentials for an advance in Massachusetts, the superior resources of the State which

we have for several years been observing. In meeting with the bee men of different parts of the State and in talking with them at their conventions, in studying the flora in different localities, and in observing the markets, we have become convinced that Massachusetts is peculiarly fortunate.

Resources of the State.

Vermont and New York are famous honey-producing States, both from the size of their crops and the quality of their honey. In a more limited area, Massachusetts combines most of the desirable conditions of these States. For instance, in the Champlain valley of Vermont the crop from white clover is superior and large. In Massachusetts the Connecticut valley has a tangle of clover, and, what is more, it is supplemented by fall flowers, golden rod and asters, which are excellent nectar yielders. In this valley we are told that the flow is almost continuous from spring, when the fruit blooms, until the asters and the golden rod have been killed by the frost in the fall. In the northern part of the State is a belt of bass wood, which, too, is found in sections of Vermont and in New York, and which is reported a heavy yielder in Massachusetts. There is also a superior yield of raspberry, so prized in Michigan. Looking to the coast, we find a flora peculiar to that section. It is hardly to be expected that a good crop could be taken from the sand of the Cape. Clethera and sumac, supplemented by shore plants abounding there, produce, to our knowledge, a fine grade of honey.

Much of the State is under cultivation, where bees will surely thrive, especially if there is orcharding and production of clover crops. Some of the most delightful honey in the world is taken in the fruit belts, from apple bloom. The first prize extracted honey at the Worcester Bee Show, 1906, was from this source.

Climate.

The New England climate, sometimes looked upon as the great hindrance to the industry, is not so bad, after all, if you are careful and know how to manipulate. It does interfere with the nectar secretion at times; but, on the other hand, is responsible for much of our fine honey. The winters, by some, are supposed to be dangerous to bees. But these are not hard to cope with if you will but take pains to see that your bees are strong, and that ordinary protection is afforded them. (Some hints of how successful bee men manage will be found below.)

Market.

In the peculiar condition of the market of Massachusetts there is a mine for the bee keeper. In no other State is there the combination of harvest and market which is to be found here. In a relatively small area there is a mass of people who we find are hungry for good honey. Here you have the key to a situation. Produce your honey, and sell it close at hand. This is not sufficiently realized by most people; but it is the future of the honey trade and the bee man's profits in Massachusetts. Were you living in the west, it would not be possible for you to dispose of your honey at home; but here it is not only possible for you to sell all that *you* can raise, but, with proper management, to buy and retail successfully. In other words, you have in Massachusetts an almost unlimited demand to fill, with a local crop at present limited.

We have indicated, in our paper, "Bee Keeping: how to meet its Difficulties and Dangers,"[1] the huge honey importation yearly from California and from Vermont. A large portion of this the State could herself produce, and pocket the profits. At present she produces less than one-fourth what she consumes, and at that the average allowance each year per capita is but two tablespoonfuls.

But the significant point is this: let the crop be doubled, and let the importation to the State go on just the same, and you would still find the market good. It might be necessary to promote the home trade; but from our observations a judicious amount of this will pay.

Crop of the Country.

In this connection it may be of interest to know something of the honey crop of the country, as figured by Dr. E. F. Phillips of the United States Department of Agriculture, expert in charge of apiculture.

As opposed to the doubtless incorrect figures of the census, which put the United States crop for 1899 at 61,000,000 pounds, it has been estimated that 200,000,000 pounds more nearly represent the annual crop of honey. The estimate is based on the fact that in two States 50,000,000 pounds are manufactured yearly. The crop of extracted honey can well be figured at twice the crop of comb, which would approximate 200,000,000 pounds of honey yearly, or enough to fill 10,000 freight cars. Were this crop to sell at the extremely low figure of 10 cents per pound, the industry would represent $20,000,000. But this is exclusive of the value of the bees and of the wax crop, which would bring the figures high. However, in order to get an accurate figure of the worth of the bees to the country, we would have to add to the sum of the items above that incalculable figure which would represent the value of the bees to the fruit producers of the country. This would bring the figures far beyond the human conception.

In these huge money values we have not reached our limit. We have scarcely begun to utilize the bees. But advance with so small a creature and one so imperfectly understood is slow. With the hope of helping some one to climb a rung higher in the art, we venture to suggest a few items which appear imperative to the immediate progress of apiculture in Massachusetts.

When we conceive of the vast power of a bacterial or germ disease in the human race, and the havoc it plays if unchecked, we can conceive of the damage possible if such should get headway among bees.

Diseases of Bees.

There is no one factor, we are convinced, which has worked and is working, unconsciously and unknown to most bee keepers, so much damage as are the diseases of bees. While they have been known to exist and have been recognized for centuries, they have not been understood by the majority of bee keepers. A man loses a colony of bees from no apparent cause. He immediately attributes it to bad luck, because the "bug" which caused it is not large enough to be seen. Or, if the moth has entered, and a bug is really large enough to be obvious, the loss is due to the moth, which, in reality, may be only secondary.

Not infrequently do we hear of some one losing all his bees at one stroke. It is on record that for some reason the industry in localities

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[1] Crop Report, Massachusetts State Board of Agriculture, 1904.

had slowly dropped out. We hear the farmers say that fifty years ago "nearly every farm had some bees." People wonder why it is that there are not more bees kept in certain sections. Why these observations?

We believe that in a large measure disease is the answer. Unconsciously to the bee keepers of the State, this great natural force has been at work weeding out the bees of the country. It is high time that every one who has bees should become thoroughly acquainted with the now recognized diseases. Of these there are two which attack the brood, and upon which the National Department of Agriculture is at work. They are as follows: —

American foul brood, which is most widespread in the United States, and which is due to a micro-organism (plant) known as *Bacillus larvæ*. We quote the symptoms as given by Dr. E. F. Phillips (Circular No. 79, United States Department of Agriculture): —

The adult bees of an infected colony are usually rather inactive, and do little toward cleaning out infected material. When the larvæ are first affected they turn to a light chocolate color, and in the advanced stages of decay they become darker, resembling roasted coffee in color. Usually the larvæ are attacked at about the time of capping, and most of the cells containing infected larvæ are capped. As decay proceeds these cappings become sunken and perforated, and, as the healthy brood emerges, the comb shows the scattered cells containing larvæ which have died of disease, still capped. The most noticeable characteristic of this infection is the fact that when a small stick is inserted in a larvæ which has died of the disease, and slowly removed, the broken-down tissues adhere to it, and will often stretch out for several inches before breaking. When the larvæ dries it forms a tightly adhering scale of very dark brown color, which can best be observed when the comb is held so that a bright light strikes the lower side wall. Decaying larvæ which have died of this disease have a very characteristic odor which resembles a poor quality of glue. This disease seldom attacks drone or queen larvæ. It appears to be much more virulent in the western part of the United States than in the east.

European foul brood, due to *Bacillus alvei*, causes the most rapid loss abroad, and is the type of disease heretofore generally described. Again we would quote Dr. Phillips, from the same paper: —

European foul brood (often called "black brood") is not nearly as widespread in the United States as is American foul brood, but in certain parts of the country it has caused enormous losses. It is steadily on the increase, and is constantly being reported from new localities. It is therefore desirable that bee keepers be on the watch for it.

Adult bees in infected colonies are not very active, but do succeed in cleaning out some of the dried scales. This disease attacks larvæ earlier than does American foul brood, and a comparatively small percentage of the diseased brood is ever capped. The diseased larvæ which are capped over have sunken and perforated cappings. The larvæ when first attacked show a small yellow spot on the body near the head, and move uneasily in the cell. When death occurs they turn yellow, then brown, and finally almost black. Decaying larvæ which have died of this disease do not usually stretch out in a long thread when a small stick is inserted and slowly removed. Occasionally there is a very slight "ropiness," but this is never very marked. The thoroughly dried larvæ form irregular scales, which are not strongly adherent to the lower side wall of the cell. There is very little odor from decaying larvæ which have died from this disease, and when an odor is noticeable it is not the "glue-pot" odor of the American foul brood, but more nearly resembles that of soured dead brood. This disease attacks drone and queen larvæ very soon after the colony is infected. It is as a rule much more infectious than American foul brood, and spreads more rapidly. On the other hand, it sometimes happens that the disease will disappear of its own accord, — a thing which the author never knew to occur in a genuine case of American foul brood. European foul brood is most destructive during the spring and early summer, often almost disappearing in late summer and autumn.

It being impracticable here to give detailed discussion of the treatment of these diseases, we would refer you to the above-mentioned circular, which can be had free upon application, or to a more full account of both the treatment and character of the disease: The Bacteria of the Apiary, with Special Reference to Bee Diseases, Technical Series No. 14, Bureau of Entomology. Price 10 cents. This bulletin may be had from the superintendent of documents, Washington, D. C., at the price affixed.

We urge every one who has not alreadya copy of this paper, the most up-to-date work on the subject in any language, to secure one.

Get Rid of the Box Hive.

Do not allow one to persist in the country. To progress in bee keeping there is nothing more detrimental and hindering.

A box hive is a total handicap to any bee keeper. If there is any brood disease in his region, the box hive is a sure trap, and endangers all the bees for a radius of miles. In it the disease can get headway and exist for a long time without being discovered, unless you are unusually familiar with its symptoms. The colony in the hive weakens; robber bees enter, fly back to their hives, and nine to one contaminate their own combs.

Furthermore, a box hive is of no advantage to the owner. You are limited in the amount of honey you get. You can not inspect your bees, nor force them, nor build them up when necessary. You simply have to let them alone. However, if this be your policy, you can as well have your bees in a frame hive, and at least set the good example, or have semblance, of up-to-dateness.

It is not difficult to transfer your bees from box to frame hive, if you do it in the spring, or fourteen to eighteen days after a prime swarm. It is then that the brood and honey are light, and of little hindrance.

Transferring to Frame Hives.

The methods of transferring are all essentially the same. Fundamentally, it consists in driving out the bees with the queen, which is imperative, and cutting out the combs. These, as you wish, may be fitted into frames and given back to the bees in the new hive, or may be melted down for the wax and honey.

When preparing for a transfer, make ready a frame hive. Have also a "forcing box" about the diameter of your box hive, into which to drive the bees. You will need for tools a hammer, heavy chisel, broad-bladed bread knife, some strings or tapes or elastic bands with which to secure the combs in the frame, some dishes to receive the surplus combs and honey, and a pail of water in which to wash your hands of honey. For the drumming, two heavy sticks or the hammers may be used.

In making the transfer, a warm day, when the bees are flying freely and are less cross, will be found preferable.

We usually commence, after all is in readiness, by pounding for two or three minutes on the sides of the hive with the sticks. This at once arouses the bees to filling themselves with honey. The moment that they appear full and begin to "march" out of the entrance, pick the hive up and move it to some place previously selected, aside from the bee yard. Here you can proceed with less annoyance from the rest of the bees.

Place an empty hive or box on the old stand, in order to catch and save the bees which are returning from the field.

When every bee in the box hive is gorged with honey, turn the hive upside down, pull off the bottom board, and substitute the forcing or driving box, in which you will collect the bees. If this does not make good union with the sides of the old hive, you had best put a strip of cloth temporarily around the joint, so that when the bees march up from the combs they can not take wing or boil over the sides of the hive, but must go up into the driving box. When once they are fairly started into the box, the cloth may be removed and the box tilted back on one edge, which will receive the jar of the drumming. With the forcing or driving box in position, as described, recommence your pounding. In a few moments the bees will be seen to quit their combs and in regular procession file up into the box. As is said above, the box may be tilted back as soon as the procession is well started.

It will be necessary to keep up this pounding until practically every bee is off from the old combs, when, being sure you have the queen with them, you may carefully lift the forcing box and bees, carry it to the new hive, which should be placed near the old stand, and, as in hiving a swarm, dump the bees either into or before the hive on a sheet, whereupon the bees will enter as would a natural swarm. To avoid robbers, do this in the late afternoon.

The old hive should now be knocked apart, and what combs are suitable should be fitted into empty frames. It is usually desirable to save all the large, straight combs, especially those in which there is brood; but crooked combs are more bother to fit and manipulate than their worth, and are usually melted for wax.

Unless the transfer is made in very early spring (when the operation should be done in the house, in order to prevent chilling), before there is much honey in the fields, it is not necessary to transfer or otherwise give the colony combs of honey. The clean honey is usually cut out and taken to the house; combs in which there are both honey and pollen mixed are fed back to the bees.

As fast as the combs are trimmed and precisely fitted to the inside of the frames, they should be secured by several turns of string or tape or by elastic bands about the frame. The frames may then be hung in the hive, where the bees will fasten in the combs and remove the bindings.

After a little experience a neat operator can transfer rapidly, and do a clean job. The only way to become expert is to begin now, and develop your own manipulation.

Heddon Method.

A method essentially the same as the above, but adapted to those of limited time and experience, and to those who are somewhat timid, is the Heddon Method.[1] It consists in forcing or driving into the box, as above, about the time of swarming, nearly all the bees of the box hive colony, together with their queen. Into a frame hive on the old stand and with full sheets of foundation, run the bees, as described above. The old box hive should then be placed a few feet back of the new. If the weather be cool, sufficient bees should remain with the brood of the old hive to care for and keep it warm.

Twenty-one days after this transfer is made, all the brood will have hatched, leaving nothing in the combs but honey. The rest of the bees are now driven out as above, and united with those of the first drive. The old hive may be disposed of when and as you will, but should not be left around for robbers.

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[1] Cleanings in Bee Culture, A. I. Root Company, p. 562, 1885.

If for no other reason than to promote the bee keeping industry, put your bees, if now in box hives, on to frames. See to it also that your neighbors do likewise; you will be repaid many fold.

If we can but rid the State of this one hindrance to progress, the worth of the industry will advance many per cent.

In order to demonstrate how much behindhand you may be, we would remind you that it was in 1851, more than fifty years since, that Rev. L. L. Langstroth devised the movable "frame" hive. Of it, in his journal, Oct. 30, 1851, he says: "The use of these frames will, I am persuaded, give a new impetus to the easy and profitable management of bees." Large bodies move slowly, despite such unquestionable impetus.

Influence of the Type of Hive.

Closely associated with the problem of transferring is the selection of the style of hive to use, and its influence upon the success with bees.

If you would get all you can out of your bees, the type of hive which you use will greatly hinder or increase your results. For instance, as we attempt to show, the box hive is worth almost nothing to the owner; he cannot take surplus in marketable form from the frame. Again, many of the frame hives in use are too small. They cramp the queen, do not allow her to lay to her full capacity, and consequently dampen the crop.

Of course to prescribe for everybody's needs is difficult; but for those who use the Langstroth size frame we would advise by all means a ten-frame hive. If possible, use two bodies at that. Your queen, if she is young and prolific, will take care of that number of combs; you will get the returns. Moreover, we believe personally in a free-hanging, so-called "unspaced" frame; it allows more freedom in handling than a "spaced" frame, and where propolizing is heavy, it is a delight. The new frame manufactured to be used with "tin spacers," but used without the tins or the "unspaced frame," has been very satisfactory to the writer.

Section Boxes.

In connection with types of hives, we would say that the 4 by 5 or other oblong section is promising to market better than the square section. Ask a merchant which of these two sell the better, and his usual experience is the oblong. "It looks larger," say his customers. Æsthetically speaking, the oblong is more pleasing than the square, which doubtless has its unconscious influence on the trade.

Vigor of the Stock.

Correlated with the size of the hive are the virtue and value of a vigorous stock. If you have colonies which are healthy, but unprolific and lacking vigor, the queens had best be killed and be succeeded by some young, prolific blood. But in a cramped hive, say a box or even eight-frame hive, the most prolific queen may fail to bring results in terms of honey, simply because she has not room. Give the same colony ten or more frames to breed up on, and you may not believe your eyes; you may question that it is the same queen.

Dr. Kirkland, in the "Ohio Farmer," Dec. 12, 1857, upon transferring from box hives three colonies, of which "the first had not swarmed in two years; the second had long ceased to manifest any industry; and the other had never swarmed," says: "Within twenty-four hours each

colony began to labor with far greater activity than any of my old stock. . . . I have now no stronger colonies than these."

Where breeding for queens, no pains should be spared in selecting for the most vigorous prolific stock possible. We believe it worthy to disregard looks, color, size, markings and even gentleness, if necessary, in order to get a race which will have vitality, vigor and prolificness. This will usually mean honey-gathering qualities as well. Select for a strain of *honey* bees, not, as has been the policy, for "handsome" bees.

To those who are interested in breeding queens, we would suggest that you send to the National Department of Agriculture, superintendent of documents, Washington, D. C., for as full an account of the methods employed as has yet been published. The title is: Bulletin No. 55, Bureau of Entomology, The Rearing of Queen Bees. Price 5 cents.

Wintering.

This problem, while not directly pertinent to the progress of bee keeping, has a direct influence on success or failure. Most of the bee keepers of Massachusetts consider the problem only in terms of "luck" and "bad luck," instead of reasoning intelligently the conditions for successful wintering. In our paper in the Crop Report for 1904, already alluded to, we treated the subject more or less fully. But here we would add a few observations made since then, which may help to enlighten the puzzling subject for some one.

That our winters are severe there is no doubt; but they are no worse than those of New York State, of Vermont, or of Canada, where such extensive bee keeping is done.

In visiting bee yards and talking with bee keepers, particularly the past spring, after the severe winter of 1906 and 1907, I noticed that the careful and painstaking man brought his bees through all right, whether he wintered in the cellar or on the summer stands. It is the merit of cellar wintering which so favorably impressed me, however.

Particular success was observed at the yard of Dr. William P. Brooks and Dr. James B. Paige at Amherst. We saw these bees in April, about a week after they were brought out from the cellar. Without exception, they were the finest stocks which we have ever seen in Massachusetts at this season. They had not appreciably decreased in numbers during the winter, they were clean, healthy, had large amounts of stores left, and, best of all, had patches of sealed brood on several frames. Moreover, when seen again in the middle of May it was evident, without exception, that they had not "spring-dwindled," as so many of the breed did last spring, but that they had maintained their strength, many of them occupying two ten-frame hive bodies. This shows, too, that they had not been over-stimulated.

Likewise, Mr. H. F. Cary of Lyonsville, who wintered a hundred colonies in a cellar, told us that most assuredly he could not have carried through the number he did had he wintered out of doors.

We can not afford the space here to discuss adequately the features of wintering, but we will briefly list the essentials to success.

First, about 40 pounds of stored honey are necessary to winter a large colony, especially out of doors.

Second, the colony should be populous, with plenty of young bees.

Out-door wintering necessitates a protection of paper or other wrapping, as described in our paper above mentioned.

Cellar wintering, while expensive in the first cost, is a saving in the end. The bee cellar should be dry, capable of easy ventilation and complete darkening. Ventilation will allow the cooling off or the

warming up of the cellar at will; the dark will prevent the bees from flying about the room. It is advisable, in order to insure dryness, to have the cellar bottom cemented.

Temperature is a vital factor. The cellar should be furnished with a thermometer. For the best results, the temperature should be maintained at from 35° to 45° F. all winter. In the spring, as the bees begin to breed, it is safe to allow it to go as high as 48°. Over this is likely to make the bees uneasy.

As soon as the weather becomes settled, and the bees have begun to rear brood, it is best to take the bees from the cellar for good. According to the location, this will be in March or early April.

If you have difficulty in maintaining the proper heat, it is customary to reduce the temperature by putting in the cellar for a few hours a cake of ice or some snow. If you need to raise the temperature, you can do so by burning an oil lamp.

It will pay all those who have any number of colonies or neighbors to build a bee cellar. The labor of doing this is slight, as is the trouble of putting the bees in the cellar and taking them out; and the security is great. With a little experience and reason, any one will be able to winter his bees this way.

Caring for the Crop and marketing it.

We have so far considered factors which may facilitate getting more honey and doing a better bee business. But the thought of what to do with the crop after we have it, how to care for it and how best to market it, seldom enters our consideration. All we look for is the honey; we are not particular to keep it sweet, clean and unharmed by the moths.

One of the most difficult things in apiculture is to properly keep and to prepare the honey crop for market. The extracted crop is most easily handled, for it can be run into cans, of the producers' choice, sealed and set away for market. To put up an attractive package of extracted honey is an art, and requires no little thought and skill.

Unfortunately, it is difficult to obtain in any convenient quantity good extracted honey in our market. It is all in either small glass packages, which are mere samples and are expensive, or it is in cases of two 60-pound cans, which are difficult for the private customer to obtain except through the wholesaler.

In preparing the comb honey crop we can do no better than to follow the procedure of a gentleman who ships the finest comb clover honey which we have ever seen. We have often heard what care Mr. R. H. Holmes of Shoreham, Vt., takes with his crop, and we well know the high rank it commands in the market.

In the first place, Mr. Holmes stores his combs, as fast as they come from the super, in an attic where it is dry and hot (not hot enough to melt the wax). This allows the honey to ripen, and prevents a chemical change in its constitution, which frequently happens if stored in a damp atmosphere.

In the fall, when it comes to shipping, each section is carefully scraped and polished until you are scarcely able to see the marks of a bee. The sections are then sorted and graded, — a task, as Mr. Holmes tells us, which requires the most extreme care and experience. Only the heaviest and most perfect sections are put into the first quality. We have seen case after case of twenty sections weigh as high as 23 pounds; that is surely giving full weight. After sorting, the sections are put into cartons and then packed into spotless cases, holding, as we said, 20 pound sections each. The whole is then ready for shipment.

It is frequently necessary to fumigate the combs, in order to prevent the work of the wax worms. This can be done in several ways; by confining the sections either in a room or in a tight box, where they are disinfected with carbon bisulphide, hydrocyanic gas or formaldehyde.

The key to success in this is the neatness with which all is done, the maintaining of the flavor and fragrance of the honey by storing it properly in a dry, warm atmosphere; in a word, presenting a thoroughly clean, wholesome and inviting package.

Never store honey of any kind in an ice box or other damp, cold atmosphere.

All the suggestions that we could give, if we were to continue for pages, would not help you to progress as much as a little practical experience. Work intelligently with your bees, trying to bring the best results possible, and you will succeed. Keep in touch with what others are doing, by reading. Read all the bee literature you can get hold of, from the four corners of the earth. Some of it, to be sure, will not be worth while, but it is the only way to keep in the advance.

Besides reading, untold benefit can be derived from a society. At these meetings enthusiasm runs high; you are in contact with the most active bee keepers of your section, and can, through verbal discussion, learn more than by much reading.

Massachusetts now has two societies. Most central in the State is the Worcester County Bee Keeper's Association, which holds regular meetings the second Saturday of each winter month, beginning in November, in Horticultural Hall, Worcester, at 2 o'clock P.M. The fee of this society is but 50 cents for membership until an assessment becomes necessary, which as yet has never been the case. Full particulars may be learned of Mr. Arthur H. Estabrook, secretary, Clark University, Worcester, Mass.

The other society, the Massachusetts Bee Keeper's Society, holds its meetings in Boston, monthly, in places voted at each previous meeting. Mr. F. H. Farmer, president, 15 Chardon Street, Boston, Mass., will gladly furnish details. The fee is 50 cents per annum.

We strongly urge you to co-operate with these societies. They need your support; they will help support and promote you. Through their work and influence largely the greatest advance and progress in bee keeping are to be expected.

For those who wish to learn bee keeping or the most advanced principles and methods, a course in apiculture is given annually at the Massachusetts Agricultural College, Amherst, Mass., beginning the fourth Wednesday in May, and lasting two weeks. You have the benefit of lectures and demonstrations by four of the regular staff of professors and one special apicultural expert. For particulars write to the registrar of the college.

In conclusion, we would emphasize that apiculture, an ennobling, uplifting, healthful, inspiring, and, to say the least, fascinating and profitable pursuit, must become something more than a haphazard pursuit. "Luck" plays no part; reason, intelligence, experience and skill have far more to do with success. It is our earnest effort and hope to eliminate the more or less generally slack and careless methods for that easier, modern rational manipulation.

Keep your bees; do not let them keep themselves.

SERIES OF 1907. VOL. 20. NO. 5.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF SEPTEMBER, 1907.

BIRD PROTECTION.

ISSUED MONTHLY, MAY TO OCTOBER, BY STATE BOARD OF AGRICULTURE, STATE HOUSE, BOSTON, MASS.

J. LEWIS ELLSWORTH, *Secretary.*

ENTERED JUNE 3, 1904, AT BOSTON, MASS., AS SECOND-CLASS MATTER, UNDER ACT OF CONGRESS OF JUNE 6, 1900.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1907.

Approved by

The State Board of Publication.

Crop Report for the Month of September, 1907.

Office of State Board of Agriculture,
Boston, Mass., Oct. 1, 1907.

Bulletin No. 5, Crop Report for September, is herewith presented. The article in this month's issue differs in character from those ordinarily given, as it does not deal with the culture or management of any farm crop, animal or product. It is, nevertheless, upon a subject of vital importance to all farmers, particularly in view of the numerous and increasing insect pests which the farmer now has to meet. It is entitled "Statutory Bird Protection in Massachusetts," and is by Edward Howe Forbush, ornithologist of the Board. It gives a history of the protection of birds in the Commonwealth from colonial times, and also contains interesting conclusions and suggestions for future improvement in the protection of the farmer's feathered friends.

Progress of the Season.

The monthly report of the Crop Reporting Board of the Bureau of Statistics of the Department of Agriculture (Crop Reporter for September, 1907) shows the condition of corn on September 1 to have been 80.2, as compared with 82.8 a month earlier, 90.2 in 1906, 89.5 in 1905, and a ten-year average of 81.

The average condition of spring wheat when harvested was 65.5, against 75.6 a month earlier, 83.4 in 1906, 87.3 in 1905, and 66.2 in 1904.

The average condition of the oat crop when harvested was 65.5, against 75.6 a month earlier, 81.9 in 1906, 90.3 in 1905, and a ten-year average of 82.

The average condition of barley when harvested was 78.5, against 84.5 on August 1, 89.4 on September 1, 1906, 87.8 in 1905, and a ten-year average of 84.3.

The average condition of buckwheat on September 1 was 77.4, against 91.9 a month earlier, 91.2 in 1906, 91.8 in 1905, and a ten-year average of 88.2.

The average condition of potatoes on September 1 was 80.2, against 88.5 a month earlier, 85.3 in 1906, 80.9 in 1905, and a ten-year average of 79.4.

The average condition of tobacco on September 1 was 82.5, against 82.8 a month earlier, 86.2 in 1906, 85.1 in 1905, and a ten-year average of 82.8.

In Massachusetts the average condition of corn September 1 was given as 79; the average condition of oats when harvested as 86; the average condition of buckwheat September 1 as 84; the average condition of tobacco as 88; the average condition of potatoes as 80; the average condition of Canadian peas as 93; the average condition of beans as 85; the average condition of cabbages as 80; the average condition of onions as 85; the average condition of tomatoes as 84; the average condition of apples as 55; the average production of peaches as 20; the average condition of cranberries as 75; the average production of cantaloupes as 75; the average condition of watermelons as 76; the number of stock hogs fattening, compared with last year, as 97, and their average condition as to size and weight as 97.

Temperature and Rainfall for the Whole Country.

[From the National Weekly Weather Bulletins.]

Week ending September 2. — The temperature of the week was unseasonably low in New England, the northern portion of the Middle Atlantic States, the eastern portion of the lower Lake region, throughout the Plateau regions, and in the Pacific coast States. The mean temperature was above the normal throughout the central valleys, Southern States, and the greater part of the upper Lake region. The rainfall was less than the normal over much of the greater part of the country east of the Rocky Mountains. With the exception of limited areas in the central Gulf States, and on the west Gulf coast, there was a marked deficiency in the precipitation throughout the Atlantic coast and Gulf States, a large

part of which received no appreciable amount. Heavy rains occurred in eastern Nebraska and the northern portions of Iowa, Illinois, Indiana, western Ohio and southwestern Michigan.

Week ending September 9. — The mean temperature for the week was above the normal throughout the States bordering on the Atlantic and Pacific, in the Southern States, and over the southern Plateau and southern Rocky Mountain regions. The week was cooler than usual in the lower Missouri, upper Mississippi and lower Ohio valleys, the average daily deficiency in temperature being from 3° to 5°. The precipitation for the week was above the normal in New England, the interior of the Middle Atlantic States and the lower Michigan peninsula, from Kentucky and eastern Tennessee southward in a narrow belt to northern Florida, in parts of Arkansas and over most of Oklahoma. There was a deficiency generally in the upper Mississippi and lower Missouri valleys, over most of the Lake region, on the South Atlantic coast, in southern Florida and central Alabama, over most of Mississippi and Louisiana, and throughout the whole of Texas. The rainfall for the week amounted to more than 2 inches in New England.

Week ending September 16. — The mean temperature for the week was above the normal in the Atlantic coast districts, Lake region and upper Mississippi and lower Missouri valleys, generally throughout the middle and southern Plateau regions, and over portions of the northern and southern Pacific coast regions. The departures were most marked in the northern Lake region and New England, where they ranged from 6° to 8°. The mean temperature was below the normal in the lower Ohio valley, central Gulf States and middle Pacific coast region, and from Minnesota westward to northern Idaho. Very heavy rains fell along the central and east Gulf coast and in central Pennsylvania. The precipitation was below the average along the immediate Atlantic coast northward of South Carolina, over the southern portion of the upper Lake region and generally throughout the upper Mississippi and Missouri valleys.

Week ending September 23. — The mean temperature was above the normal along the immediate coasts of Washington, Oregon and central California, and in all districts east of the Rocky Mountains, with the exception of the region westward of Lake Superior and the eastern coast of southern Florida. In the Plateau regions and northern Rocky Mountain districts the mean temperature was below the normal, the deficiency ranging from 2° to 5° per day. Heavy rains fell throughout an area extending from eastern South Dakota over the upper Mississippi valley and the southern portion of the Lake region to the middle Atlantic coast. There was less than the normal over the northeastern portion of the upper Lake region, in New York and northern New England, on the Atlantic coast from Virginia to Georgia, in the Ohio, central Mississippi and lower Missouri valleys, over the greater part of Texas, and generally throughout the Rocky Mountain Plateau and Pacific coast regions.

Special Telegraphic Reports.

[Weather Bureau, Boston.]

Week ending September 2. — New England. Boston: Showers were general on the 30th. The precipitation for the week was small. Drought continues. A heavy rain is needed throughout New England. The mean temperature was below the normal. The nights were cool, and light frost occurred on the 28th in parts of Maine, New Hampshire and Vermont. The sunshine was somewhat below the normal.

Week ending September 9. — New England. Boston: Rain fell the greater part of the week in amounts ranging from 1 to 3 inches, and was of great benefit, completely relieving the drought. The temperature was higher and seasonable, without the cool nights which prevailed during the two preceding weeks. There was no sunshine, excepting part of two days.

Week ending September 16. — New England. Boston: Cloudy weather prevailed during the first two days, with copious showers on the 10th and 11th throughout the section. The last of the week was generally clear. The mean temperature was above the normal. The maximum temperatures

during the last five days in the southern portion were near or slightly above 80°. The sunshine was near the normal.

Week ending September 23. — New England. Boston: The mean temperature was above the normal. The maximum temperatures on the 21st ranged from 78° to 88°. Light frost occurred on the 19th in Vermont and New Hampshire and killing frost in the interior of Maine. The weather was fair, except at the beginning and the end of the week, when light showers occurred. The sunshine was somewhat above the normal.

The Weather of September, 1907.

Fair weather prevailed on the 1st of the month, but during the following four days there was a heavy rainfall throughout the State that effectually relieved the drought that had prevailed during July and August. In no section of the State was the rainfall from the 2d to the 5th less than 2 inches, and in some parts it was nearly 4 inches. Following the 5th and until the 11th there were occasional showers, which were light in the eastern portion of the State and quite heavy in the central and southwestern portions, where the rainfall was slightly more than 1 inch. From the 12th to the 20th fair and generally clear weather prevailed. Rainy weather again began on the 21st and continued until the 25th, during which time from 2 to nearly 4 inches of rain fell over the greater portion of the State. Fair weather prevailed from the 25th to the 27th, with cloudy weather on the 28th and very heavy rains on the 29th. The temperature during the first three days of the month was somewhat below the normal. From the 5th until the 24th, however, with the exception of three or four days, the temperature was much above the normal, and much like that usual to August. On about half of the days during this time the temperature rose to nearly or above 80°. From the 25th to the close of the month the temperature was lower and somewhat below the normal. In some localities frost occurred on the night of the 25th.

So far as records are available for comparison, the present summer, from the middle of June until the 2d of September, has been the driest ever known in this State.

In the circular to correspondents returnable to us September 24 the following questions were asked: —

1. How does the crop of Indian corn compare with a normal crop?

2. Are rowen and fall feed up to the usual average?

3. Has the usual amount of fall seeding been done, and what is its present condition?

4. How does the onion crop compare with a normal crop?

5. How do potatoes compare with the normal in yield and quality?

6. What is the prospect for root crops, celery and other late market-garden crops?

7. How have apples, pears, peaches, grapes and cranberries turned out?

8. Have many apple trees been set out in your locality of late years, either in new orchards or to replace old trees?

Returns were received from 138 correspondents, from which the following summary has been made: —

Indian Corn.

The rains and warm weather of September benefited the corn crop materially, so that at the time of making returns it seemed that the crop would be a fair one in most sections. Much still remained uncut at that time, and it is possible that the expectation of improvement then held by many correspondents will not be realized. However, the crop is, even allowing for all drawbacks, considerably better than was anticipated a month earlier. Killing frosts had not occurred at the time of going to press, and it seemed likely to be secured in fair order. Ensilage corn was backward all the season and therefore was not cut as early as usual, much remaining in the field at the time of making returns.

Rowen and Fall Seed.

The rains came too late to materially benefit the rowen crop, which was very light in all sections, except on early-cut, low-lying fields, and even under those conditions it was not as heavy as usual. That which remained uncut at the time of

making returns might possibly improve, but the danger of damage from frosts would not allow of a much longer season for its increase. With the rains of September, feed in pastures took a new lease of life and improved to a marked degree. Mowings also that had begun to turn brown, on light land, with the continued drought, recovered to the extent that they again became green and luxuriant, though the growth was not such as to yield any bulk of hay in these cases.

Fall Seeding.

Very much less than the usual amount of fall seeding had been done at the time of making returns, owing to the prolonged drought putting the land in unfit condition for seeding, and the rains of September interrupting farm work to a considerable extent. It was going on at the time of making returns, and probably nearly as much as usual would be done before the close of the fall season. That which was put in earlier generally failed to germinate until the coming of the rains, and was for that reason short and backward. There was some complaint also of its being uneven in germination and growth, but this was by no means general.

Onions.

Onions were hardly up to the normal, taking all the returns into consideration, for while there was little blight reported, and the quality of the crop was generally excellent, they were said to be smaller than usual, owing, doubtless, to the long-continued dry weather, so that the yield per acre would probably be considerably below the normal. Harvesting was rather later than usual, as the crop was backward, like all others, and slow in curing.

Potatoes.

Potatoes are considerably under a normal crop in yield, due to the effects of the long-continued drought. They are reported as rather smaller in size than usual, and not particularly abundant as to number of tubers. In the western counties there was more or less complaint of rot, which does not

seem to have appeared in other sections. The quality of the crop was generally reported to be good, except where attacked by rot, with little damage from insects.

Root Crops, Celery, etc.

Root crops were generally backward and not up to the normal, though considerably improved by the rains of September. On the Cape the turnip crop seems to be nearly a failure, owing to failure to germinate because of the drought of the latter part of the summer. Celery is hardly up to the normal, taking all sections into consideration, but is considerably improved, and promises to yield a nearly average crop. Late market-garden crops of all kinds are backward, but are coming on rapidly since the rains, and with favorable weather promise good yields. Prices have generally been higher than usual.

Fruit.

Apples are reported as somewhat better than was expected, but still far from an average crop for the State as a whole, even for an off year. As always with a light crop, the quality is not of the best, and strictly No. 1 fruit is exceedingly scarce. Pears are also a very light crop in most sections, the poorest, indeed, for some years. Peaches are nearly a total failure. Grapes are a fair crop, but there is some doubt as to whether they will mature before killing frosts. Cranberries are late in ripening, not being nearly all secured at the time of making reports, the berries are of small size, and it is not likely that the crop will be above two-thirds of the normal.

Setting of Apple Trees.

The question as to the setting out of apple trees was asked with a view to learning whether this particular branch of orcharding was holding its own, increasing or falling behind in the State. In Franklin County and southwestern Worcester County the reports would indicate that rather more than enough trees had been set out to make good the yearly loss of old trees, in fact, that the industry was gaining ground. Elsewhere, with a few local exceptions, the reverse seems to be

the case, and not enough trees are set out each year to make good the yearly loss in many sections. Among the reasons given is that farmers have lost confidence in nursery stock, as they have had difficulty in getting it true to name, and there also appears to be some fear of the San José scale. Another reason is that returns are too slow in coming in after establishing an orchard. It is to be hoped that our farmers will realize that this course is not for their best interests, and that there will be a revival in the most staple and certain of all fruits.

NOTES OF CORRESPONDENTS.

(Returned to us September 24.)

BERKSHIRE COUNTY.

New Marlborough (E. W. Rhoades). — The corn crop will be light and is not yet cut. Meadows and pastures are looking well. Very little fall ploughing has been done as yet, owing to dry weather. Although some fields of potatoes run small, the average yield is good and quality excellent. Apples are not fully grown, but half of a normal crop may be harvested. Not many apple trees have been set out of late years, not enough to keep the number good. Cabbages have not done well.

Tyringham (E. H. Slater). — Indian corn is about 75 per cent of a normal crop. Rowen and fall feed are not up to the average. Very little fall seeding has been done. Only a few onions are raised here. There is a fair yield of potatoes, but some fields are rotting. Root crops, celery and late market-garden crops not grown to any great extent. There is a light crop of apples, also of grapes. Some apple trees have been set to replace old trees and in two or three new orchards.

Lee (A. Bradley). — Indian corn is 85 per cent of a full crop. Fall feed is in good condition, but there is very little rowen. Potatoes are nearly a full yield, but a third of the crop is rotted on some fields. The prospect for root crops, celery and late market-garden crops is good. Apples 40 per cent of a full crop; peaches very poor; grapes nearly a failure. There has hardly an apple tree been set out of late years.

West Stockbridge (J. S. Moore). — If frosts hold off for another week there will be about the usual yield of corn. Rowen and fall feed have suffered from drought. The usual amount of fall seeding has been done, and it is looking well. Onions are little raised. There is less than the usual acreage of potatoes, but little complaint of rot. Apples are looking well in some sections and in others are but half a crop. Very few apple trees have been set out of late years. On account of scarcity of help farmers are going into the dairy business, the new creamery giving a ready market at good prices.

Becket (Wm. H. Snow). — There will not be a normal crop of corn by one-fourth, and some fields will not mature. Rowen will be a good crop, but dry weather makes it late. Not much fall seeding has been done, owing to the lateness of the season. Potatoes will

be a normal yield and of good quality. The prospect for root crops, celery and other late market-garden crops is very good. Fruits make a much better yield than was expected, though maturing late. Not many apple trees have been set out of late years, farmers being dissatisfied with the nursery stock and grafting the native trees.

Washington (E. H. Eames). — Indian corn is two-thirds of a crop. Fall feed and rowen are only half yields. No fall seeding has been done as yet. Potatoes are of the best quality for two or three years, and will give two-thirds of a normal yield. Root crops, celery and late market-garden crops are raised only for home use, and look well. Apples will give half a crop; pears one-fourth crop; cranberries normal. No apple trees have been set out of late years.

Hancock (B. H. Goodrich). — Indian corn is much below the normal. Rowen and fall feed are in poor condition. Almost no fall seeding has been done in this section. Potatoes are below normal in yield, but of good quality. Root crops, celery and late market-garden crops are not grown to any extent. Apples are a light crop; other fruits little grown. Very few apple trees have been set out of recent years.

Cheshire (L. J. Northup). — At this date the corn crop is short 50 per cent. Rowen and fall feed are not up to the usual average. The usual amount of fall seeding has not been done. The quality of potatoes is fine, but the quantity is not up to the normal. Root crops are good yields as far as observed. Apples are more plenty than was expected; pears and grapes are quite plenty. Apple trees are to some extent being replaced by new ones.

New Ashford (Elihu Ingraham). — Indian corn is a good yield. Rowen and fall feed are not up to the usual average. Less than the usual amount of fall seeding has been done. Onions are not raised. Potatoes are half a normal crop, of good quality. Root crops, celery and other late market-garden crops are not raised. There is a fair crop of apples. A good many apple trees have been set out during recent years.

FRANKLIN COUNTY.

Rowe (N. E. Adams). — Indian corn is about two weeks late. Rowen and fall feed are not up to the usual average. Only a small amount of fall seeding has been done, and it is in fair condition. Potatoes are a fair yield, of good quality. Apples are a good crop; no peaches; grapes fair. A good many apple trees have been set in new orchards.

Charlemont (J. M. J. Legate). — Corn is very late, but little being cut; needs a week or ten days more without frost. There is a very short crop of rowen, but fall feed has improved since the rains. Potatoes are usually a good crop where grown on moist land. Very few roots are grown, and none for market. The apple crop will be about half an average crop. I know of no apple trees being set, and

in adjoining towns, where some grafting has been done, the deer have taken out all scions they could reach. There is no use setting out young trees or grafting, as the State, through the town officers, is not willing to pay one-half the damage the deer do.

Leyden (Frank R. Foster). — Indian corn is not up to the average, and very late in ripening; very little cut at this date except for ensilage. Rowen and fall feed are not up to the usual average. The usual amount of fall seeding has been done, and is in good condition. There is a heavy crop of potatoes, of fine quality, but rotting badly at this date. Apples are a fair crop; pears light; peaches a failure; grapes fair. Many apple trees have been set out of late years.

Ashfield (Albert Howes). — Corn is 85 per cent of a full crop. Rowen and fall feed are very short. The usual amount of fall seeding has been done and looks well, but is late. The yield of potatoes is fully average, and of excellent quality. Market-garden crops could not recover from the dry weather. Apples are a little small, but of fine color and quality; practically no other fruits. Not many new apple orchards have been set in the last five years, but old trees have been replaced well.

Whately (Clifford L. Crafts). — Indian corn is below the average, but the late season is helping it. Rowen and fall feed were checked by the dry weather. About the usual amount of fall seeding has been done, and it looks well. There is an excellent crop of good, hard onions, but the acreage is less than last year. Potatoes are a good crop, a larger yield than usual, but show some rot. The prospect for root crops, celery and late market-garden crops is very good. There is a very light crop of fruits, and no peaches at all. A great many old apple trees have been replaced, but few new orchards set out. Fall work is well advanced.

Sunderland (Geo. P. Smith). — About a normal crop of corn is being put into the silo and cut for grain. There is an average crop of rowen, but some injury from overripeness and rain in curing. The usual amount of fall seeding has been done, and it is in fair condition on moist land. There will be a normal yield of onions, but some fields are yet green, with many scullions. Potatoes are not yet harvested, but the prospect is good, in spite of some rot. The prospect is good for root crops, celery and other late market-garden crops. Apples are 40 per cent of a full yield; few pears or grapes. Not many apple trees have been set out of late years. Tobacco is nearly all harvested; no sales reported.

Montague (A. M. Lyman). — Indian corn is a fair crop, owing to recent rains and warm weather. The rains came too late to produce more than half a crop of rowen. More than the usual amount of fall seeding has been done, and it is looking well. The yield of onions is very fair, 20 per cent more than last year. Quality and yield of potatoes best in many years. Root crops, celery and other late market-

garden crops are very promising now. Apples are 40 per cent of a full crop; pears 5 per cent; no peaches; cranberries 50 per cent. About enough apple trees have been set out to replace old ones.

Wendell (N. D. Plumb). — Corn is about half of a normal crop. The drought spoiled all prospect of the rowen crop. But very little fall seeding has been done as yet, but it is looking well. Potatoes are of good quality, and will average about three-fourths of a normal crop. Apples are a very poor crop; no pears or peaches. But few apple trees have been set out in recent years. This has been a poor season for farmers, as wages have been high and crops short.

New Salem (Daniel Ballard). — Indian corn is late, but nearly a normal crop. There is short feed, and but little rowen. But little fall seeding has been done so far. There is a good crop of potatoes on fairly moist land, and they are of fine quality; some complaint of rot. Garden celery is looking well. Apples are a variable crop, but a medium crop as a whole; few pears; no peaches; grapes and cranberries more plenty. Enough apple trees have been set out to keep old orchards good and perhaps some increase.

HAMPSHIRE COUNTY.

Greenwich (W. H. Glazier). — Indian corn is about a three-fourths crop. But very little rowen will be cut this year. No fall seeding has been done, but there will be a little later. Potatoes are a fair yield, of excellent quality. Root crops, celery and late market-garden crops are only grown for home use. Fruit is but little grown. I do not know of any apple trees having been set out recently.

Enfield (D. O. Chickering). — There will be about an average crop of corn. Rowen and fall feed are not up to the usual average. But little, if any, fall seeding has been done in this section. Yield and quality of potatoes good, but some rot. Root crops, celery and late market-garden crops are good, though but little grown for market. Fruits of all kinds are very light, except cranberries, which are good where grown. Some apple trees are set out each year, but not very many.

Amherst (Wm. P. Brooks). — Corn is a little late, and rather below the average in yield. The rowen crop is much below the average, on account of late cutting of first crop and drought; fall feed good. Fall seeding is mostly done in corn, probably the usual amount; improving rapidly, but hardly in average condition. Onions are below average in size, but the crop will be about average. Yield and quality of potatoes both above average, but there is now some rot. Root crops and celery look well. Apples uneven, but many fine trees; pears average; no peaches; grapes very late and not yet ripe; no cranberries grown here. Rather few apple trees have been set out recently. Tobacco has been a heavy crop, and the early cut is curing well.

Hadley (L. W. West). — Indian corn is 80 per cent of a full crop. Rowen is about one-third of an average crop; fall feed above the average. The usual amount of fall seeding has been done, and it is in good condition but late. Onions are above an average crop. Potatoes are above the normal in yield and quality. The prospect is good for root crops, celery and other late market-garden crops. Apples light; few pears; no peaches; few grapes. Late tobacco has improved since the rains.

South Hadley (W. F. Person). — Corn is about a two-thirds crop. Rowen is about half a crop, and fall feed is poor. Onions are about an average crop. Potatoes are good in quality and a good yield, with good prices. Root crops and garden crops are in good condition. Apples are very few; no peaches; few grapes. There have been a good many apple trees planted in this locality, both in replacing old trees and in new orchards.

Williamsburg (F. C. Richards). — There is a full average crop of Indian corn. Rowen and fall feed are 50 per cent below the average. There is a full average crop of onions of good quality. The yield of potatoes is good and the quality fair. The prospect is good for root crops, celery and other late market-garden crops. Apples 40 per cent of a full crop; pears 10 per cent; no peaches. No apple trees have been set out of late years except in large commercial orchards.

Chesterfield (Horatio Bisbee). — Indian corn has made a good growth, but there is little of it ripe and ready for harvest. Rowen and fall feed are not up to the usual average. There has been less than the usual amount of fall seeding done, on account of the dry weather. The yield of potatoes is fully up to the normal, and the quality is good. There is almost a fair crop of apples in this vicinity, though perhaps a little off in size. There have not been many apple trees set out in recent years.

Goshen (Alvan Barrus). — Indian corn is very uneven, some fields maturing finely and others not at all; frost every month on low ground. Rowen is nearly a failure in many places, except as fall feed, which late rains have much improved. Dry weather made fall seeding late, and it is not yet completed. Yield of potatoes very uneven, but quality good, with no rot. The fruit yield is very uneven; grapes late in maturing. Apple trees have not been set out largely of late, diseased trees having called a halt in the business.

HAMPDEN COUNTY.

Tolland (Eugene M. Moore). — Indian corn will be about two-thirds of a normal crop. Rowen and fall feed are 50 per cent below the usual average. Potatoes are about two-thirds of a normal crop in yield, and of good quality. Root crops are coming on since the recent rains and will be fair crops. Apples are very light; few pears

and other fruits; cranberries rotting on the vines. Very few apple trees have been set out of late years.

Russell (E. D. Parks). — Indian corn is from one-half to two-thirds of a normal crop. Hardly any rowen will be cut. No fall seeding has been done as yet. Onions are little raised. Potatoes are about a two-thirds crop. Root crops, celery and other late market-garden crops are looking well. Some apples look well; little other fruit this year. Only a few apple trees have been set out of recent years.

Southwick (Luzern A. Fowler). — Corn is below an average crop. No rowen will be cut, but fall feed has been greatly benefited by the recent rains. The usual amount of fall seeding has been done, and it is in good condition. There is a fair yield of early potatoes, but late ones are below normal. The prospect is good for root crops, celery and other late market-garden crops. Fruit of all kinds is scarce.

West Springfield (T. A. Rogers). — Corn is three-fourths of a normal crop. Rowen is about half a crop, and fall feed has improved since the rains. About the usual amount of fall seeding has been done, and it is starting well now, though a little late. Onions are about half a normal crop. The yield of potatoes is below the normal, but the quality is good. But few root crops grown; celery and other market-garden crops late. Apples one-fourth crop, also pears; no peaches; grapes a full crop. But few apple trees have been set of recent years, and those on small farms.

Ludlow (Chas. B. Bennett). — Indian corn is about half a crop. Rowen is less than half a crop; fall feed fairly good. About the usual amount of fall seeding has been done, and it looks very well. Potatoes are a fair yield, but very scabby. The prospect for root crops, celery and other late market-garden crops is very good. All fruit very light; no peaches; very few grapes. Very few apple trees have been set out in recent years. Many farmers are going out of the milk business on account of the high price of hay and grain.

Hampden (John N. Isham). — Corn is a little better than a three-fourths crop. But little rowen has been cut, but fall feed is much better than in August. Less than the usual amount of fall seeding has been done, but it is starting well. Onions are about three-fourths of a normal crop. Average yield of potatoes about 80 per cent, and quality good. Root crops and other late market-garden crops are looking well. Most fruits are short crops. But few apple trees have been set out, hardly enough to make good the loss of old trees.

Monson (F. D. Rogers). — Corn is eared well, but is late, and there will be much that is soft when cut. Rain came too late to make an average crop of rowen, but fall feed is good. The usual amount of fall seeding has been done, and it is looking well. Potatoes are fully up to the average, but show some rot. There are few apples of good quality; pears very light; practically no peaches. There are no large apple orchards set out, only a few trees in a place.

Holland (Francis Wight). — Indian corn is very nearly a normal crop. The rowen crop and fall feed are not up to the usual average. Not much fall seeding has been done about here. Onions are not up to a normal crop. Potatoes are up to the normal in yield about here. Root crops, celery and late market-garden crops are about in average condition. Apples, pears, grapes and cranberries have turned out fairly well. Not many apple trees have been set out in recent years.

WORCESTER COUNTY.

Warren (W. E. Patrick). — Indian corn is not over 50 per cent of a normal crop. Very little rowen will be cut; fall feed is improving. Fall seeding is late on account of the dry weather, and has not yet germinated. Potatoes are very uneven, some fields good, even extra good, and others very poor; altogether the crop is below the normal. There are very few apples; pears a small crop; no peaches; grapes a fair crop, but very late. Some apple trees are set out every year to replace old orchards, and also to increase the number, but no large orchards.

Brookfield (Frank E. Prouty). — Indian corn is about a two-thirds crop. There is no rowen, but fall feed is growing now. About the usual amount of fall seeding has been done, and it is just beginning to come up. Onions are little raised here. Potatoes are not over half a crop. Root crops, celery and other late market-garden crops have been hurt by drought. Apples half a crop; pears half a crop; no peaches or cranberries; grapes a fair crop. Quite good a many apple trees have been set out in recent years.

West Brookfield (Myron A. Richardson). — Corn is good in places, but late and below normal as a whole. The rowen crop is an entire failure. Seeding in corn is coming on since the drought was broken. Potatoes are below normal in quantity, but of good quality. The turnip crop is a failure, on account of the dry season. Fall apples are few and poor, but there will be about the usual crop of winter apples; grapes are abundant. Some new orchards of both apples and peaches have been set out, and quite a deal of replacing done.

Barre (John L. Smith). — Corn is little grown except for the silo, and is uneven and hardly up to the average. There is very little rowen, and fall feed is also short. The usual amount of fall seeding has been done, but it is late and does not show much yet. Potatoes are a good yield; no rot and quality good. Apples are half a crop, but more than usual for an off year. Not many apple trees have been set out recently; a few small orchards.

Dana (Lyman Randall). — Corn has grown fast since the rains, and will be a fair crop, though perhaps not quite up to the normal. Rowen will not be half a crop; fall feed fairly good. About the usual amount of fall seeding has been done, and it looks very promising.

Onions are about a normal crop. Potatoes are about normal, both in yield and quality. Root crops are good; no celery raised. There is a very small crop of fruits; apples poor in quality; cranberries fair. There have been some apple trees set out each year, but no large orchards.

Hubbardston (Chas. C. Colby). — Indian corn is very late in ripening, and will be about 80 per cent of a normal crop. Very little rowen will be cut, and fall feed is very poor. Potatoes are a little below normal in yield, but excellent in quality. There is a poor crop of apples. Very little attention is paid to fruit, only small numbers of trees having been set out.

Templeton (Lucien Gove). — Indian corn is a light crop, not over 80 per cent of the normal. Rowen and fall feed are very light indeed. Very little, if any, fall seeding has been done. Potatoes are of good quality, but the yield is light and below the average. Apples a light crop of poor quality; pears very light; no peaches; grapes very late. There is no interest in setting out new apple orchards as they are considered unprofitable.

Westminster (A. E. Hurd). — Corn is a three-fourths crop, the dry, cold weather making it very backward. Rowen is almost a failure; fall feed light, but improved since rains. There was not quite the usual amount of fall seeding done, but it is fairly well started. Potatoes are about 65 per cent of a normal crop in yield; quality good, and almost no blight or rot. Root crops are little grown. Apples small, poor and a short crop; pears light; no peaches; grapes fair; cranberries few. Perhaps enough apple trees are set out each year to replace old ones dying, but this is doubtful.

Fitchburg (Dr. Jabez Fisher). — The rowen crop is trifling, and fall feed scant. A considerable number of apple trees have been set in new orchards, and some to replace old trees. Apples will be about 25 per cent of a full crop, of good quality, and pears about the same. Grapes are looking finely, but can hardly mature before hard frosts.

Princeton (A. O. Tyler). — Indian corn is about half a normal crop. There is very little rowen; fall feed fairly good. No fall seeding has been done as yet. Potatoes are about half a crop, of fair quality. The prospect is good for root crops, celery and other late market-garden crops. Apples are about half a crop; pears and grapes good; no peaches; cranberries very few. A few apple trees have been reset, probably not enough to replace the old ones that are dying out.

Sterling (Henry S. Sawyer). — Indian corn is not a normal crop. Very little rowen will be cut; fall feed much improved since the rains. About the usual amount of fall seeding has been done, but its growth has been checked by drought. There is a fairly good crop of potatoes, of good quality. There will be fair yields of beets and carrots. There is a fair crop of apples, pears and grapes.

Bolton (H. F. Haynes). — Some fields of corn are good and some poor, about 80 per cent of the normal as a whole. There is very little rowen, but fall feed is fairly good. Onions are little grown, but are a very poor crop. Potatoes are 70 per cent of a normal crop. Root crops, celery and late market-garden crops promise medium yields. Cranberries are a poor crop; no peaches; pears about normal; apples half a crop. No apple trees of any account have been set out in recent years.

Worcester (H. R. Kinney). — Indian corn is light and very late. Rowen and fall feed are improving since the rains, and will be fair with warm weather. About the usual amount of fall seeding has been done, and it is growing well. Quality of onions good, but size rather small. Yield of potatoes only fair, but quality good. Root crops, celery and late market-garden crops promise average yields. Apples poor; pears fair; no peaches; grapes poor. There have been but few apple trees set in recent years.

Southborough (Edward F. Collins). — Corn was injured by the drought, and is about half a crop. Rowen is half a crop, there being very little, except on low land. Fall seeding is the poorest for many years at the present time, but will probably improve. Potatoes are about a two-thirds crop, of good quality. There is one-fourth of a crop of apples; few pears; no peaches. Very few apple trees are set out, and many old trees cut down every year.

Leicester (H. H. Kingsbury). — Indian corn is much behind in stage of growth and ripening. The rowen crop is a failure, fall feed scant and pastures very short. Very little fall seeding has been done, but it is in good condition. Yield of potatoes normal, and quality excellent. Beets, carrots and parsnips are in fine condition. Apples and pears are half crops; no peaches nor cranberries; few grapes. No apple trees have been set to replace old trees or for new orchards.

Oxford (D. M. Howe). — Corn was injured by the drought, but is now filling out well. Rowen and fall feed are not up to the usual average. About the usual amount of fall seeding has been done, and with the rains is looking well. Onions look well. There is about a normal crop of potatoes, and no rot as yet. Late market-garden crops are in good condition; cabbages are heading out well. There is not an average crop of fruit, although apples are fairly good. Not many apple trees have been set out of late years.

MIDDLESEX COUNTY.

Sherborn (N. B. Douglas). — Indian corn was seriously injured by drought. There is very little rowen, except on low ground. About the usual amount of fall seeding has been done, and it looks fairly well. Potatoes are light in yield, but good in quality. There is not 10 per cent of a crop of apples; few pears; no peaches; grapes and

cranberries dried up and small. Very few apple trees have been set in the last five years.

Hopkinton (W. V. Thompson). — Corn is about half a crop. There is no rowen, and but little fall feed. About the usual amount of fall seeding has been done, and it is looking well now. Onions are little raised, and are not a full crop. There is about three-fourths of a crop of potatoes, of good quality. Root crops, celery and late market-garden crops are little raised. Few apples and quality poor; small crop of pears; no peaches; grapes a small crop; few cranberries raised. Not many apple trees have been set out of recent years.

Marlborough (E. D. Howe). — Indian corn is about 85 per cent of a normal crop. Rowen and fall feed are decidedly not up to the usual average. The usual amount of fall seeding has been done, and the recent rains are starting it in good shape. Onions are 80 per cent of a full crop. Yield of potatoes 75 per cent, quality 100 per cent. Apples 40 per cent of a full crop; pears 30 per cent; grapes 90 per cent. There have been very few apple trees set out in recent years. Strictly No. 1 apples are very scarce.

Sudbury (Edgar W. Goodnow). — Indian corn is below the average. Rowen and fall feed are below the usual average. The usual amount of fall seeding has been done, but it is backward at present. The onion crop is about normal. Potatoes are yielding well and are of good quality. The prospect for root crops, celery and other late market-garden crops does not look encouraging. Apples, pears, peaches and grapes are light crops, and cranberries plentiful. There have been from three to four hundred apple trees set out in this locality the past year.

Stow (Geo. W. Bradley). — Corn is below the normal. Rowen is not very good, but late rains have helped fall feed. Not much seeding has been done so far. Onions are a very poor crop this season. Potatoes are below the average in yield, with some complaint of rot. There is very little prospect for root crops, celery and late market-garden crops. Apples are a poor crop, and pears a fair one. Very few apple trees have been set out of late years, but a good many peach trees have been.

Dunstable (A. J. Gilson). — Indian corn is below a normal crop. Rowen is far below the usual average, but fall feed has improved since the rains. The usual amount of fall seeding has been done, and is in good condition. Onions are not cultivated to any great extent, but are a normal yield. Potatoes are somewhat below the normal, but are of good quality. Apples are very scarce and poor; pears and peaches none; grapes and cranberries medium yields. Two new orchards of apple trees have been set out by one man, in all about two thousand trees, and they are doing well.

Billerica (Geo. P. Greenwood). — Rowen and fall feed are not up to the usual average. But little seeding has been done, and, except

on moist land, it is in very poor condition. Onions are a fairly good crop. Potatoes are a poor yield. Celery is generally very small, and most root crops are poor. There are very light yields of fruit, except cranberries, which are 70 per cent of a full yield. Not many apple trees have been set out of late years.

Carlisle (Alvah Carr). — Indian corn is not quite a normal crop. There will be a very light crop of rowen, owing to drought. Less than the usual amount of fall seeding has been done, owing to dry weather, and that put in has come up very poorly. Onions are not quite a normal crop. Potatoes are of good quality, with about half a crop. There are very few root crops on account of dry weather. There are few apples and pears; no peaches; grapes and cranberries fair. Not many apple trees have been set out in recent years. Feed is very scarce and high, cows also scarce and high, and with the scarcity of help many farmers are selling their stock down to what they can take care of themselves.

Concord (Wm. H. Hunt). — Indian corn will be below the average. The rowen crop will be small. The usual amount of fall seeding has been done, and it is looking well. Potatoes are of good quality, but light in yield. Market-garden crops are generally doing well. Apples are light and poor; few pears; no peaches; some grapes and cranberries. Some few apple trees have been set, somewhat more than enough to replace the old trees.

Winchester (S. S. Symmes). — Indian corn is not raised. Rowen and fall feed are not up to the usual average. Onions are little raised. Potatoes are of good quality, but a light crop. Root crops very poor, and celery small. There is a very small crop of fruit, and almost no peaches. No apple trees have been set in recent years. The rains came so late that turnips and other late crops cannot grow to full crops. Pastures have now some feed.

Stoneham (J. E. Wiley). — Indian corn is very little raised. Rowen and fall feed are not up to the usual average. The usual amount of fall seeding has been done, but it is not very far advanced as yet. Onions are a fair average crop. Potatoes are a small crop, of good quality. The prospect is good for root crops, celery and other late market-garden crops. Apples and pears are fair crops, and grapes a good crop. No apple trees have been set out in recent years.

Weston (Henry L. Brown). — Indian corn is very little grown. There is not much rowen, but fall feed is good. About the usual amount of fall seeding has been done, but not much has come up as yet. Some growers report potatoes of good quality but few in the hill, others that they are all small. Roots are backward; celery poor; cabbage and other late crops backward. There are very few apples, as they dropped badly; pears a small crop; no peaches; grapes and cranberries little grown. No apple trees have been set out of recent years.

ESSEX COUNTY.

Haverhill (Eben Webster). — Corn is not quite up to the normal. Rowen is 25 per cent less than a normal crop. About the usual amount of fall seeding has been done, and most of it is looking well. Rather less than the usual crop of onions will be secured. Potatoes are a small yield, and of poor quality. The prospect for root crops, celery and other late market-garden crops is fair. Apples and pears are one-fourth crops; no peaches; grapes fair. Not many apple trees have been set out in recent years.

Andover (Milo H. Gould). — Corn is not up to the normal, owing to late planting and dry weather. Rowen and fall feed are not up to the usual average. The usual amount of fall seeding has been done, and the late rains have made it look finely. Onions are a good crop. Potatoes are above the average in both quantity and quality. The prospect is good for root crops, celery and other late market-garden crops. There are few apples and pears; no peaches; few grapes; cranberries a good crop. Very few apple trees have been set out in new orchards of late years.

Newbury (George W. Adams). — Corn is about 85 per cent of a full crop. Rowen and fall feed are far below the average. About the usual amount of fall seeding has been done, and it is in fair condition. Onions are about a three-fourths crop. Potatoes are 80 per cent of the normal in yield, and a little below average in quality. The prospect for root crops, celery and other late market-garden crops is fair to good. With the exception of grapes, the fruit crop is a practical failure. Not many apple trees have been set out in recent years.

Rowley (D. H. O'Brien). — The corn crop is hardly normal. Rowen and fall feed are not up to the usual average. The usual amount of fall seeding has been done, and the condition is quite good. Onions are a good crop. Potatoes are below the average in yield and quality. Root crops are good, celery fair; frost has damaged many late market-garden crops. Apples are a short crop; pears scarce; no peaches; few grapes; cranberries plenty, but quality poor and damaged by frost. Very few apple trees have been set out in recent years.

Essex (Aaron Low). — Indian corn is a fair average crop. Rowen and fall feed are up to the usual average. Less than the usual amount of fall seeding has been done. Onions are a very light crop. Potatoes are a light crop, of poor quality. The prospect is very poor for root crops, celery and other late market-garden crops. Apples are a fair crop in yield, but of poor quality; pears, peaches and plums a failure. Scarcely any apple trees have been set out in recent years.

Manchester (John Baker). — Corn compares well with a normal crop. Rowen is not up to the usual average, but fall feed is good since the rains. Onions are a good crop. Potatoes are a small crop,

but of good quality. The prospect is good for root crops, celery and other late market-garden crops. There are few apples and fewer pears; no peaches; grapes fair; also cranberries. Not many apple trees have been set out of late years.

NORFOLK COUNTY.

Beechwood (Ellery E. Bates). — Indian corn is not raised. There is good fall feed, but no rowen will be cut because the rains came too late. About the usual amount of fall seeding has been done. Onions are about a normal crop. Potatoes are a light crop, but are of good quality. Root crops, celery and late market-garden crops are about normal. There is a small crop of fruit. Very few apple trees have been set out in recent years.

Westwood (Henry E. Weatherbee). — The corn crop will not be up to the average in yield. The rowen crop will be very short, and fall feed will be good. About the usual amount of fall seeding has been done, and it is rather late but looking well. Onions will be a fair crop. Potatoes will be a light crop, but of fair quality. Cabbages will not be up to the average; root crops very good. There are very few apples and pears; no peaches; grapes and cranberries good. Very few apple trees have been set out, except to replace old trees.

Walpole (Edward L. Shepard). — Corn will be about 65 per cent of a normal crop. There is very little rowen, but fall feed is looking better than three weeks ago. Not much fall seeding has been done, and its condition is not up to the average. Potatoes are about half a crop, with quality about normal. Root crops, celery and late market-garden crops are backward, but looking fairly well, and will do well if frosts hold off. There will be less than half a crop of fruit. Very few apple trees have been set out of recent years.

Millis (E. F. Richardson). — Indian corn is about 40 per cent of a normal crop. There is no rowen, but fall feed has started a little. Much less than the usual amount of fall seeding has been done, and it is now at a standstill. Onions are about a three-fourths crop. Potatoes are 60 per cent of a normal crop, and of fine quality. Root crops, celery and other late market-garden crops will be light yields. The yield of fruit of all kinds is light.

Franklin (C. M. Allen). — Indian corn is a three-fourths crop. Rowen and fall feed are very light. Three-fourths the usual amount of fall seeding has been done, and it is looking well though backward. Very few onions are grown, but they are a good crop. Potatoes are a light yield, of good quality. Root crops, celery and other late market-garden crops will give light yields. There are very few apples and pears, no peaches, and light crops of grapes and cranberries. Very few apple trees have been set out in recent years.

BRISTOL COUNTY.

Mansfield (Wm. C. Winter). — Very little corn is likely to mature. Abundant rains are bringing up pastures finely. No seeding has been done so far. Onions are little grown. Quality of potatoes good, yield of early below normal and of late uncertain. Root crops, celery and late market-garden crops are generally a failure. Apples and pears one-third crops; no peaches; grapes fair; cranberries uncertain. Very few apple trees have been set out except in private gardens.

Attleborough (Isaac Alger). — Indian corn is below the average. There is no rowen; fall feed is good. Very little fall seeding has been done. Potatoes are about an average crop in yield and quality. The prospect is fair for root crops, celery and other late market-garden crops. There will be a small crop of fruits. Not many apple trees have been set out in recent years.

Seekonk (John W. Peck). — Corn is about a three-fourths crop. Rowen and fall feed are nearly up to the average, the warm weather and abundant rains having worked wonders. The usual amount of fall seeding has been done, and is looking well. Onions are fully up to the normal in quantity and quality. Early potatoes on heavy ground gave an abundant yield, but later ones suffered from drought. Turnips, carrots and parsnips are full crops, and celery is growing fast. Apples, pears and peaches are very scarce; grapes plenty. Very few apple trees have been set out in this locality.

Swansea (F. G. Arnold). — Indian corn is about 80 per cent of a normal crop, owing to extreme drought. There is no rowen and fall feed has only just started. Very little seeding has been done and it is just coming up. Potatoes on dry land are very light, and rather poor in quality. Onions are a fair crop, and are bringing good prices. Turnips are very small; late cabbages good. The yield of fruit is very poor. Very few apple trees have been set out in recent years.

Dartmouth (L. T. Davis). — Indian corn is quite a little below the normal in most places. There is no rowen to speak of, and fall feed is light. Not as much fall seeding has been done as in some years, and some lots are just coming up. Onions are about a normal crop. Potatoes are of fine quality, but are below normal in yield. Root crops will be light, and late market-garden crops below the normal. Apples are a light crop; very few pears; no peaches; grapes and cranberries not raised. We have no orchards of any size, apples being raised only for home use.

Acushnet (M. S. Douglas). — Indian corn is a normal crop. Rowen and fall feed are not up to the usual average, but have started recently and are now looking well. The usual amount of fall seeding has been done, and it has just started. Onions are a very good crop. Potatoes are a two-thirds crop, of excellent quality. Root crops, celery

and other late market-garden crops will give short yields. Apples are half a crop; no peaches or pears; cranberries fair. A few new apple orchards have been set out.

PLYMOUTH COUNTY.

Norwell (Henry A. Turner). — If there is not an early frost the corn crop will be abundant. There is very little rowen, and fall feed is rather short. Very little fall seeding has been done. Onions are about a normal crop. Potatoes are about normal in yield, and of good quality. Root crops, celery and other late market garden-crops are backward and small for the season. Apples are a short crop; grapes and cranberries good crops. Not many apple trees have been set out in recent years.

Marshfield (John H. Bourne). — On some low lands Indian corn is a normal crop, but more fields show half a crop, with 70 per cent an average for the whole. Rowen and fall feed are not up to the average, but grass is growing very rapidly since the rains. Very little seeding has been done, but many are just sowing. Onions are a short crop. Potatoes are not more than half a crop, but the quality is said to be very good. Most root crops are small, but celery promises well. All fruits except cranberries are small crops; cranberries nearly average. A few have set large apple orchards and intend to set more still, the interest being rather greater than formerly.

Duxbury (R. T. Randall). — Indian corn is not up to the normal. Rowen is not very thick. Not as much fall seeding as usual has been done, but it is in good condition. Onions are a normal crop. Potatoes are a good crop, with no rot as yet. Not much celery is grown; other late market-garden crops as usual. Apples are a poor crop; very few pears, peaches and grapes. Cranberries are plenty, but later than usual. Very few apple trees are set out in this locality.

Bridgewater (Rowland Cass). — Corn is below the average in fodder and grain. There is no rowen except on low land, and that is below the average. But very little seeding has been done as yet. Very few onions are grown in this locality, and the yield is below the normal. Potatoes are below the normal in yield, but are of good quality. Root crops are backward, but with favorable weather the outlook is good. There seems to be a good yield of apples, pears and grapes. No new apple orchards are set out, but a few trees are set every year.

Plympton (Winthrop Fillebrown). — Indian corn is about an average crop, far better than was expected. Rowen and fall feed are not up to the usual average. Very little fall seeding has been done this year. Onions are small, but of good quality. Potatoes are turning out better than expected. Market-garden crops are doing very well. Grapes are plenty, and cranberries about an average crop. Very little setting out of apple trees has been done of late years.

Carver (J. A. Vaughan). — Warm weather and frequent rains of late have brought up the rowen and fall feed. Less fall seeding has been done than usual. No onions raised here this year. Early potatoes were about all dried up, but late potatoes are yielding better. There are small crops of apples and pears, and no peaches. Many old orchards have been cut down, and but few apple trees have been set to replace them. Cranberries are sound, but smaller than usual and late in ripening.

Rochester (Geo. H. Randall). — Indian corn is about a three-fourths crop. There is very little rowen, owing to drought; feed has started since the rains. Very little seeding is done, and it is generally looking well. Onions are about a three-fourths crop. Potatoes are of good quality, and the yield on low land is good, while on high land they are not worth digging. Carrots, beets, parsnips, turnips and cabbages are growing fast. Few apples and pears; no peaches and grapes; cranberries generally good, though the cranberry worm has reduced the yield on some bogs one-half or more. More apple trees have been set out for the last five years than for the five preceding years.

BARNSTABLE COUNTY.

Bourne (David D. Nye). — Owing to the dry weather fall feed is backward, but is coming along, and with rains will be average. No fall seeding to speak of has been done. Onions are very scarce. Potatoes are nearly a failure, except those that were planted very early, which did fairly well. Late market-garden crops are very little raised. Roots of all kinds are very poor crops. Cranberries are a fair crop; other fruits very scarce. Very few apple trees have been set out in recent years.

Mashpee (W. F. Hammond). — Indian corn is less than an average crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done. Onions are a little better than an average crop. The yield of potatoes is below the average, but the quality is good. Late market-garden crops are in good condition. Apples and pears are one-third crops; grapes above the average; cranberries about half a crop.

Barnstable (John Bursley). — Corn is possibly 75 per cent of a normal crop. Rowen and fall feed are not up to the usual average. The usual amount of fall seeding has been done, much of it having been sown within a few days. Onions are very light, not over one-third of a normal crop. Potatoes are from one-half to two-thirds of a normal yield, and of good quality. Cape turnips are not in evidence, possibly 5 per cent of a full planting. Apples, pears and grapes fair crops; very few peaches; cranberries not over two-thirds of a crop.

Brewster (Thomas D. Sears). — There is a very small crop of Indian corn. Rowen and fall feed are below the usual average. The usual

amount of fall seeding has been done, but its present condition is poor. There is a normal crop of onions. Potatoes are below the average in yield and quality. Root crops are in fair condition. There will be about an average crop of apples, cranberries, etc. A few apple trees have been set out the last few years, mostly in new orchards.

Harwich (Ambrose N. Doane). — The corn crop is very good. Rowen and fall feed are not up to the usual average. Not much fall seeding has been done on account of dry weather. Onions are a very small crop. Early potatoes are a failure, and late ones are fairly good. The prospect is very poor for root crops, celery and other late market-garden crops. All kinds of fruit are about a failure; cranberries a two-thirds crop. Very few apple trees have been set out in recent years.

Wellfleet (E. S. Jacobs). — Indian corn is not raised. Rowen and fall feed are about up to the usual average. The usual amount of fall seeding has been done, and it is in good condition. Potatoes are below an average crop. The prospect is fair for root crops, celery and late market-garden crops. Apples are a failure; pears half a crop; cranberries a one-third crop. Few apple trees have been set out, and mostly to replace old trees.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — Indian corn is an average crop. Rowen is a failure, and fall feed is below the average. Not much fall seeding has been done. Potatoes are an average crop. The prospect is good for root crops, celery and other late market-garden crops. Fruits of all kinds are a poor crop. A few apple trees have been set out in recent years.

BULLETIN OF

MASSACHUSETTS BOARD OF AGRICULTURE.

STATUTORY BIRD PROTECTION IN MASSACHUSETTS.

By EDWARD HOWE FORBUSH, *Ornithologist of Massachusetts State Board of Agriculture.*

It is common talk, especially in rural communities, that "the more laws we pass for the protection of birds and game the fewer birds and the less game we see." A certain section of the press reflects this sentiment, even to the extent of advocating the abolition of the game laws. This is a popular error, arising from a confusion of cause and effect. If we transpose the trite saying, and opine instead that the fewer the birds and game become the more laws are passed for their protection, we shall then have the proper relation of effect and cause. When the fact is thus properly stated it becomes a truism which explains at once that the reason of the depletion of birds and game is the lack of adequate protection.

A careful examination of the laws that have been enacted for the protection of birds and game since the first settlement of Massachusetts, together with a comparison of the records of the numbers of birds observed during this period, shows clearly why statutory protection has thus far failed to protect, and indicates the remedy by which we may save those species of birds which are not already too near extermination to admit of salvation.

The earlier records of the Massachusetts Bay Colony show no provision for the protection of birds; but in 1632 it was ordered "that noe pson w^{t}soeur shall shoote att fowle vpon Pullen Poynte or Noddles Ileland but that the s^{d} places shalbe reserved for John Perkins to take fowle wth netts."[1]

Thus a single person was given a monopoly of bird destruction on certain lands.

The continued policy of unstayed slaughter had produced so marked an effect on the wild ducks, geese and swans during the first part of the next century that in 1710 a province law was enacted which prohibited the use, in fowling, of boats or canoes with sails,

[1] "Records of the Governor and Company of the Massachusetts Bay in New England," Vol. I., p. 94.

or of any kind of disguised craft. The preamble of this act states clearly the necessity for its passage as follows: —

> Whereas the water-fowl of divers kinds, which were wont in former years in great numbers to frequent the maritime towns of this province were of great service and benefit to the inhabitants, both for meat and feathers, but are now, in great measure, affrighted and driven away by many persons who have made use of boats or canoes with sails, or canoes or floats trimmed up, covered, or disguised with hay, sedge, sea-weed, ice, cloths or other materials, therein to go off to shoot at them at distances from the shoar upon the flatts and feeding ground, which practices if continued are likely to have the ill affect to cause the fowl wholly to desert and disuse the said towns.[1]

The fine imposed for infractions of the law was 40 shillings, half to go to the informer and half to the poor of the town, and the culprit was estopped from shooting for three years after conviction, on penalty of a similar fine. The act continued in force until March 10, 1713, and was re-enacted from time to time until the revolutionary period, after which it lapsed. During provincial times there appears to have been no other statute enacted for the protection of any species of bird; but the towns were empowered to raise money to pay bounties on the heads of birds and mammals, and bounties were paid on the heads of crows, blackbirds, and ruffed grouse or partridges.

After Massachusetts became a State apparently no attention whatever was paid to the protection of birds for more than a quarter of a century, for it was not until 1818 that any statutory regulation of shooting was enacted. The preamble to the act of 1818 follows: —

> Whereas there are within the Commonwealth, many birds which are useful and profitable to the citizens, either as articles of food, or as instruments in the hands of Providence to destroy various noxious insects, grubs and caterpillars, which are predjudicial or destructive to vegetation, fruits and grain; and it is desirable to promote the increase and preservation of birds of the above description and to prevent the wanton destruction of them at improper seasons.

This shows that even in those early days there was an intelligent appreciation of the value of birds to man.

At that time the effects of unrestricted shooting had become evident, not only upon the upland game birds, but even on such smaller species as robins and meadow larks. This act (chapter CIII., 1818) protected partridges and quail from March 1 to September 1, and woodcocks, snipe, larks and robins (which evidently were regarded as fair game for all) from March 1 to July 4, but it was nullified to some extent by local option, as the voters of any town could suspend the law's provisions within the town limits for one year by taking action at the regular town meeting. This act, inadequate as it was, signalized the first attempt of the Commonwealth of Massachusetts to protect her upland game birds, notwithstanding the fact that some of these birds had been decreasing in numbers for many years. Dwight wrote in his "Travels in New England and New York," published in 1821, that wild turkeys had then greatly lessened in numbers. Notwithstanding the noticeable decrease they were never protected by law, but were killed off rapidly, and the last bird of the last flock recorded in Massachusetts was killed on Mount Tom in 1851. Evidently protective laws were not the cause of the extirpation of the wild turkey. Like the great auk, it was the victim of unrestricted persecution by man at all seasons.

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[1] "Acts and Resolves of the Province of Massachusetts Bay," Vol. I., p. 667.

It will be impossible, within the limits of this paper, to give even the briefest abstract of the bird laws passed by this Commonwealth since 1818; therefore no attempt will be made to show more than their general purpose and effect. For the convenience of the reader, the legislation for each group of birds will be treated separately.

Waterfowl.

After the re-enacted province law of 1710 finally lapsed, soon after the revolutionary period, the protection of waterfowl was not taken up again in a general way until 1886. During the latter part of the seventeenth century and the earlier part of the eighteenth these birds had no protection at any time of the year, except a law passed in 1821 protecting birds on salt marshes between March 1 and September 1. Landowners, however, were allowed to shoot on their own land, and towns had local option regarding the acceptance of the law. No doubt its provisions were nullified by towns in some cases. At that time (1821) Dwight wrote that waterfowl still existed in great abundance. Even then, however, they had decreased in numbers in the waters of the most populous maritime towns, and their flocks continued to diminish, particularly in the interior, for Sylvester Judd in his "History of Hadley," published in 1863, says, "wild ducks were formerly abundant. Now but few alight about our ponds and streams." [1]

By 1865 the decrease of wild fowl, even on the remoter coastwise feeding grounds of the State, had become noticeable, and the people of certain towns began to call loudly for special local protection for the birds. In 1865 the worrying and pursuing of birds by boats on Popponessett and Waquoit bays was prohibited. This was followed in 1867 and 1869 by similar acts for the protection of sea fowl in the waters of Edgartown, Tisbury and Barnstable. Section 6, chapter 246 of the Acts of 1869, was designed to give wild fowl some protection, as it forbade shooting or pursuing fresh-water fowl or sea fowl from, or by means of, boats or vessels of any kind in any of the waters of the State. It also prohibited the killing of sea fowl or fresh-water fowl on the feeding or roosting grounds; but this was repealed the next year, and the use of batteries and swivel guns was forbidden.

By that time, however, the decrease of the more common river ducks, which are in most demand for food, had become so marked that a law was passed (1870) giving wood duck, black duck and teal protection from March 1 to September 1. This was the first real respite that these ducks had in this State during the breeding season, and the gunner was still privileged to shoot all other waterfowl at all times.

Now commenced that juggling with the game laws for which the people of this Commonwealth are famous. We tried closing the season for black duck and teal on April 1 in 1875, on April 15 in 1877 and on April 1 in 1881. We protected *all* ducks for the first time in 1886, beginning April 1. In 1888 we made the date April 15, and this date remained fixed until 1900, when at last the pitiful remnant of wood duck, black duck and teal that bred in the State were given a little peace by the revival of the first of March as the beginning of the close season. In the meantime, the opening of the season for wood duck, black duck and teal had varied considerably but was finally fixed at September 1. All other ducks can still be shot until May 20. A special law was passed in 1888 to prohibit the pursuit of black

[1] Judd Sylvester, "History of Hadley," p. 354.

ducks in boats or floating devices in Plymouth harbor, and in 1900 this was repealed, and its provisions extended to geese and other aquatic birds. Some local restrictions were enacted during the latter part of the century to prevent the use of sail boats or power boats in pursuit of waterfowl, notably in Boston harbor. Protection for the wood duck had come so late that the species continued to decrease rapidly in spite of the law protecting it during the breeding season. In 1906 the killing of this bird was prohibited at all times for five years, — an attempt to stay its extirpation which some other States are beginning to adopt.

The sale of ducks and teal during the close season is now unlawful, but only resident black ducks, wood ducks and teal receive any real protection from our game laws to-day, and they receive very little, for when men are in the field with guns in their hands until May 20 all ducks will be shot. The northern or red-legged black duck and all other ducks are protected by our law only when most of them are out of the State, and geese can be legally shot at all seasons. Who will wonder that such protection does not protect?

Shore Birds.

The first protection was extended to shore birds in Massachusetts by chapter X. of the statutes of 1821, framed to prevent the destruction of birds on salt marshes between March 1 and September 1. This act undoubtedly helped somewhat to stay the extirpation of several species. But in 1835 the curlews and other larger shore birds had been so depleted that a law was passed to protect "plover, curlew and dough bird or chicken bird" throughout the State from April 20 to September 1, *at night only*. This law failed to give the birds much respite, and their decrease continued. In 1836 the sale of marsh birds was prohibited during the close season. In 1860 a retrograde step was taken in adding July and August to the open season on the salt marshes.

The slaughter went on without much restriction until 1869, when all spring and late winter shooting of marsh birds and upland plover was cut off by closing the season from January 1 to July 1. This was repealed at the next session of the Legislature, and in 1870 the law named the close season for marsh and beach birds as April 1 to July 15, except that "Wilson's snipe, red-breasted, black-breasted and chicken plover," four of the most persecuted game birds, were left without any protection whatever.

From this time forward the law exhibited the usual vacillation in regard to dates from year to year, and the birds were protected most of the time by our statutes only when out of the State, until 1886, when all marsh and beach birds were protected from May 1 to July 1. In 1903 the beginning of the close season was fixed at March 1. After a fight of several years' duration, Mr. Geo. H. Mackay, representing the American Ornithologists Union and the Massachusetts Audubon Society succeeded in securing, in 1904, legislation prohibiting the sale of marsh or beach birds during the close season. This was followed in 1905 by an act protecting the Bartramian sandpiper or upland plover at all times for five years. Before the passage of these acts, however, several species of the larger shore birds had been practically eliminated from the State. The shore birds have always been inadequately protected, and we still allow them to be shot in summer.

Upland Game Birds.

When the Puritans landed at Plymouth the upland game birds of the colony consisted of the wild turkey, the pinnated grouse or heath hen, the ruffed grouse or partridge, the bobwhite or quail and the woodcock, which spends a part of the year on the uplands and for convenience may be classed with the others. All of these birds were very plentiful. Under a policy of unrestricted shooting the wild turkeys finally disappeared, and the heath hens, which were at first very numerous, even on the site of Boston, were so reduced in numbers that Dr. Dwight published the statement in 1821 that they were no longer common, and Sylvester Judd gives testimony in the "History of Hadley" to the effect that they probably disappeared from the region near Springfield about 1813. In 1831 they had become so rare in the State that a special act was passed protecting them during the breeding season, or from March 1 to September 1, under penalty of a two-dollar fine. This partial remedy proved entirely ineffective, and the grouse were soon destroyed and driven out until Cape Cod became their last stronghold on the mainland of Massachusetts. These birds were now disappearing throughout their range in the Atlantic coast States, and in 1837, after they had disappeared from the mainland, a special statute was passed, establishing a close season for the heath hen for four years, with a penalty of $10 and a forfeit of $10 to the landowner. This was extended five years more in 1841 and in 1844 the fine was increased to $20 in addition to the $10 forfeit to the landowner, and the possession or sale of the birds was forbidden. All these provisions, too late to be effective, were of no avail, except to protect the few left on Martha's Vineyard.

In 1855 all protection was removed from this bird; still for five years the last remnant of the race persisted, unprotected, in the wild and bushy interior of Martha's Vineyard, where they were not much molested. In 1860 they were again protected by law at all times, under a penalty of $20, but in 1870 the date of such protection was fixed at a period of five years. Since that time the remnant of the species has managed to exist on the island. They are now guarded and protected at all times, as the Commissioners on Fisheries and Game are empowered to give them special care, that this valuable game species may be propagated and increased in numbers.

The ruffed grouse or partridge, the bobwhite or quail and the woodcock had no protection in Massachusetts at any time until 1818, when the close season was established on the first two birds, beginning March 1 and ending September 1, and woodcock were protected from March 1 to July 4. Since then all these birds have been shielded by law at some season, but during the latter half of the eighteenth century there was a periodical fight between the forces of protection and those of destruction, which resulted in frequent changes of the statutes, so that at one time or another during this period the close season either began or ended in each of the fall and winter months, while the beginning of the open season fluctuated similarly through most of the summer and fall months. The quail suffers much from hard winters, and no law can protect it; but shooting should be prohibited for at least two years after each such winter, and the sale of the birds should be stopped.

A great volume of legislation has been enacted in regard to the partridge. The tendency has been to improve the bird's chances, and now with an open season of only two months, and with snaring and

sale of partridge and woodcock prohibited, these birds have a fair chance to perpetuate their species. Both the partridge and quail, however, are now menaced by contagious diseases which are likely to be introduced among them by chickens, turkeys and pheasants.[1]

The woodcock fared worst in the ups and downs of oscillating legislation, and by 1850 summer shooting had decimated the breeding birds in some localities, and it was prohibited for a while; but even as late as 1889 woodcock could be legally shot in August in this enlightened Commonwealth. At last, after more experimenting, the open season was reduced in 1900 to two months (October and November), and the woodcock now appears to be holding its own in some localities.

Pigeons and Doves.

The extraordinary abundance of the wild or passenger pigeon in this country is said to have exceeded that of any other bird in this or any other land. Early settlers of Massachusetts asserted that the passing flocks covered the whole sky for hours at a time, darkening the sun and subduing the light of day, and that but a few leagues from where Boston now stands the nests of the pigeons covered the trees of the pine forest for miles. The multitude of these birds was so prodigious, and they roamed so widely over the continent, that it became the general belief that they needed no protection, and that their extermination was impossible.

The first legislation regarding them was chapter 85 of the Acts of 1848, which was framed to protect the pigeon netters from interference, and imposed a penalty of $10 beside actual damages on any one who should be convicted of the heinous offense of frightening pigeons away from the nets. In 1849 this penalty was increased to $20, or imprisonment for not more than thirty days. Thus the pigeon was denied protection, while its greatest enemies, the netters, were safeguarded in their nefarious business. The parent birds were trapped and shot at their nesting places, and the young left to starve, or clubbed out of the nests and killed for food. Even the swarming millions of the pigeons could not withstand slaughter at all seasons. Their numbers in Massachusetts rapidly grew less. Nevertheless, we find no protection whatever accorded them until 1879, when as they were rapidly nearing extinction a law was passed protecting them on their breeding grounds; but even then the netter or hunter could trap or shoot them coming or going to or from their nests. At this time, however, the pigeons had been practically driven out of the State, and only a few were occasionally seen in the migrations; but our people were not awake to the fact that the extermination of the pigeons was very near. Finally, in 1886, when the species was nearly extinct in the State, a law was passed establishing a general close season. The last authentic record of a wild pigeon in this State is given by Howe and Allen as in 1889. In 1901 the Legislature prohibited the killing of pigeons for all time. Comment is unnecessary. The last bird I have seen recorded as killed in either the United States or Canada was taken near Babcock, Wis., in September, 1900.[2] Reports occasionally are received of the appearance of pigeons in some part of the country, and possibly there may be a few left; but naturalists are offering large rewards for specimens, and thus far not a single bird has been secured. Probably the birds seen are Carolina doves.

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[1] See the annual report of the Massachusetts Commissioners on Fisheries and Game for 1906.

[2] Mershon, W. B. "The Passenger Pigeon," p. 223. New York, 1907.

These doves, like the pigeons, once roamed over a large part of the continent, but never congregated in such large flocks, and, unlike the pigeon, they soon become gun-shy wherever they are hunted, although very tame where protected. They have thus escaped the fate of the pigeons, and a few are still found breeding in Massachusetts, while in the fall small flocks may be seen occasionally. They resemble the wild pigeon, except for their smaller size, and are often mistaken for it. There seems to have been no attempt to protect them until 1879, when they were presumably included in chapter 209 among the "other undomesticated birds, except birds of prey," etc., not to be killed at any time. This, however, gave them scarcely any immunity, as they were mistaken for wild pigeons, and are still shot by gunners when opportunity offers, notwithstanding the fact that a provision inserted in chapter 414, Acts of 1905, specifically protects them at all times.

Non-game Birds.

The Indians did not kill small birds, nor did the settlers disturb them. So long as deer, turkey, grouse, wild fowl and shore birds were abundant the smaller game birds, the herons and other fish eaters, and the song birds were safe from molestation by man. But in the first half of the nineteenth century, when the larger game grew rare, gunners and boys began shooting woodcock, snipe, robins and larks, and the act of 1818 was found necessary to protect these birds in the breeding season. From that time complaints appeared periodically in the press regarding the conduct of boys who shot small birds. Within the past twenty years immigrants from Italy have become very destructive to song birds. Until recent years there has been no provision protecting the eggs of birds. The gunners and eggers had driven away most of the sea birds from their breeding places along the coast, and the business of procuring the eggs of birds for collectors had assumed considerable proportions. Finally, in 1869, the taking or killing of all undomesticated birds not otherwise protected, except hawks, owls, crows, jays and gulls, and the taking of birds' eggs, except those of the birds above mentioned, was prohibited, but a proviso was inserted allowing the killing of birds or the taking of eggs under permit for scientific purposes. This tended to limit the work of the professional egg collector, but it failed to protect the gulls and terns, the plumage of which was eagerly sought by the milliners. Many thousands of these birds were killed on their breeding grounds and the young left to starve.

At last, in 1879, when the diminution of these birds had become painfully evident, partial protection was given the birds by establishing a close season between May 1 and September 1. In 1881 the season was shortened. In 1886 it was extended, and so on.

Finally, in 1901, the smaller gulls and the terns were protected by law at all times. The terns of Massachusetts undoubtedly would have been exterminated long before that time but for the efforts of Mr. Geo. H. Mackay and his associates in securing protection for them on their breeding grounds on Muskeeget and Penikese islands. In the meantime, the least tern or sea swallow was nearly exterminated from Massachusetts. An open season on the larger gulls was maintained until 1907, although every other Atlantic coast State which they inhabit had previously passed laws protecting them at all times.

Herons and bitterns never had any specific statutory protection in this State until 1903, when the great blue heron had been virtually driven out of the State as a breeder, and was rarely seen except during

its migrations, and the smaller herons had been greatly reduced in numbers and most of their heronries broken up. It is now unlawful to kill them at any time, except when in the act of catching trout artificially confined. Already night herons are increasing in some localities, owing to the beneficial effects of protection.

Hawks and owls never had any protection in this State until the year 1907. Most species have decreased very rapidly. Now all the most useful owls are protected at all seasons, and it is lawful to take or kill only the barred owl, the great horned owl and the sharp-shinned hawk, Cooper's hawk, goshawk, red-tailed hawk, red-shouldered hawk and duck hawk. Town bounties on the other species can no longer be legally paid or collected. All eagles and the osprey or fish hawk are likewise protected at all times.

In 1897 an act was passed providing a penalty of $10 for the offense of having in possession the body or feathers of any undomesticated bird then protected at all times by chapter 276 of the statutes of 1886. This statute also prohibited the wearing of such feathers for dress or ornament. It was aimed at the milliners who provided the feathers and their patrons who wore them, and has largely broken up the traffic in the feathers of native birds that are protected at all seasons. In 1902 the traffic in native song birds for cage purposes had grown so destructive that a special penalty of $10 was provided for capturing or possessing any bird protected by law throughout the year.

In the meantime, the shooting of small birds by foreigners about cities and near construction camps of laborers had become so serious an evil that a law was passed (chapter 317, Acts of 1905) requiring all unnaturalized foreign-born persons to pay a license fee of $15 for a license giving them the privilege of hunting. This law has checked somewhat the destruction of birds and game by Italians and other foreigners.

General Bird Laws.

One of the most important statutes for the general protection of birds and game was passed in 1899, making "the Lord's Day" a close season, and imposing on the lawbreaker the penalties incurred by breaking the game laws in addition to those usually inflicted for infractions of the "Sunday laws." This statute was revised in 1902, and in 1904 it was made still more effective and severe by providing a penalty of $10 to $20 in addition to usual fines for hunting or killing game in close season.

The Legislature of 1907 passed a law requiring all non-resident hunters, except those who were members of shooting clubs already incorporated and established in the State, to pay a license of $10 for the privilege of hunting in the State. This is a good law with the exception of the exemption.

Fines and Forfeitures.

Beginning in 1818, with a fine of $1 or $2 for the killing of each bird in defiance of the law, penalties have been increased or decreased from year to year. The general tendency, however, has been to increase the fines. The maximum of $100 per bird has been reached in the case of the heath hen. The foreigner or non-resident who hunts without a license may be fined $50. The same fine may be required of any person who kills a wood duck or from any one who uses a live decoy for black ducks in Nantucket. In general, a fine

of $20 is imposed for each game bird killed out of season, but $10 only is required in the case of each shore bird, and the same amount in that of each other undomesticated bird or each nest or egg of such bird as is protected at all times.

The Enforcement of the Bird Laws.

Until the year 1896 our game laws were rather ineffective, for there was no one who considered it his duty to enforce them. In 1896 the Commissioners of Inland Fisheries were given by law the powers of game commissioners. This was the most important step taken for the protection of birds and game up to that time, for it assured, in some measure, at least, the enforcement of the law. The powers and duties of the commissioners have been extended from time to time, and their efficiency has been increased.

In 1894 a resolve was enacted providing for the introduction of Mongolian pheasants. The species introduced was the ring-neck. In 1895 the commissioners were authorized to propagate birds and animals, and the sum of $500 was appropriated for the purpose of purchasing and propagating pheasants. While the introduction of the pheasants may not have been an unmixed blessing, the experience gained in propagating birds will be of value to the Commonwealth, for unquestionably the time has come for Massachusetts to experiment, with a view of eventually propagating and distributing native game birds to supply her depleted covers.

Needed Legislation.

This necessarily limited and imperfect review of our legislative enactments for the conservation of birds exhibits clearly the main reasons why protection has, in many cases, failed to protect. The principal reasons for this failure are four in number: (1) legislation has been spasmodic and vacillating, (2) laws and penalties have not been sufficiently stringent, (3) until recent years the laws have not been enforced, (4) *protection has come too late.*

Protection will always be ineffective if it is held back until the need for it is generally recognized. It should become operative before it becomes necessary to save a bird from extermination. Its laws should not be enacted merely with the purpose of maintaining the present number of birds. Its province should be to *increase their numbers* before they are in any danger of extinction, and legislation with this end in view *is needed now.*

In 1904 it was stated in my report on the decrease of birds [1] that at least six species of game birds, waterfowl or shore birds had disappeared, and that the wild pigeon was then practically gone from Massachusetts, and also that several other species were then nearly extirpated or driven out. Among these latter the Eskimo curlew was mentioned. To-day the belief obtains among ornithologists that both the passenger pigeon and the Eskimo curlew are extinct. It may be already too late to save the vanishing species, and the wood duck and the upland plover are in great danger.

The question arises, What more can be done to conserve and increase the birds that remain?

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[1] Forbush, Edward Howe, "Special Report on the Decrease of Certain Birds and its Causes, with Suggestions for Bird Protection." Fifty-second report of the Massachusetts State Board of Agriculture.

First, we must stop All Spring and Summer Shooting.

Evidently it is most important to allow all birds to breed unmolested. Bobolinks, blackbirds and robins which are protected on their northern breeding grounds maintain their numbers well, though slain in great numbers during the migrations in the south. If the people of New England are not to lose their supply of pond and river ducks, these ducks must be protected throughout the spring migrations and during the breeding season in these States as well as in Canada. Experience shows that in those months when the shooting of any species is allowed all edible ducks will be shot. Let the shooting of all wild fowl stop with the first day of January; let our rivers, shores and bays be free from shooting from January first to September first, and in time wood duck, black duck, teal, loons, Canada geese and other species may come back to our streams, ponds and shores, and breed as they did long ago. Teal once bred as far south as Long Island. Canada geese nested in this State, and even as far south as New Mexico. Now they have been driven north, beyond the borders of the United States.

The mere presence of man disturbs the birds very little, where no shooting is allowed. This has been proved in many cases where the wildest of wild fowl have become very tame in localities where they were unmolested. Since spring duck shooting was stopped by law in New York State the black ducks have bred in considerable numbers on Fisher's Island. New York and Connecticut have already passed laws which establish the beginning of the close season for wild ducks on January 1. New Hampshire takes February 1 as her date, except in one county, and a considerable number of other States and provinces of North America are already in advance of Massachusetts in this matter.

A law should be enacted here forbidding the taking or killing of all wild fowl and shore birds between the first day of January and the first day of September, in order that the birds may be absolutely undisturbed during that season and that some of them may breed here unmolested. Wherever such a law has been passed and enforced in a single State the effect has been beneficial almost immediately, and the birds which have been driven out have come back, bred and increased rapidly.

A Resident Hunting License.

A law requiring a one-dollar license fee of all resident hunters is now an absolute necessity. Unless such a law is passed the non-resident license law will remain a dead letter, for unless all hunters are licensed it is difficult, if not impossible, for the officers in the field to identify non-residents of the State. A resident license law, which gives to the hunter no privilege he does not now possess and gives to the landowner the right to examine the licenses of all hunters who are found upon his land, would furnish money for the protection and propagation of game, and would largely do away with a class of irresponsible trespassing hunters that is now a source of much irritation and injury to the farming population. Such laws are not experiments. They originated in the agricultural States of the middle west, and have given good results in the protection of birds and game and the safeguarding of rural property.

Wherever the agricultural population can be brought to favor and respect such laws they will prove an unqualified success.

Prohibit the Sale of Game Birds.

How much longer can our game birds be expected to survive with a price set upon their heads? If a man should attempt to cut down a great tree by snipping off the little twigs with scissors, he would be advised to begin with the axe at the root. In the attempt to protect our game birds we have been clipping away at the little twigs too long. Let us now take up the axe. The laws which have been passed regulating the sale and transportation of game are useful under present conditions, but there is one statutory provision alone which will strike at the root of the evil and check the slaughter of game birds by taking away the incentive for pot hunting, and that is to prohibit the sale of all game birds.

It would be for the interest of the marketman were this enacted, for he is now constantly hampered by restrictions and harassed by legal requirements. It would not, in the end, injure his business, for he would then sell turkeys, chickens, geese, ducks, pigeons, squabs, guineas and possibly pheasants in place of the game he now sells. Such a law would be better for the farmer and poultry raiser, who would be called upon to supply more domesticated birds to take the place of the wild ones now sold. It would be better for the sportsman, who sees himself prohibited from shooting certain wild fowl and other migrating game birds here in certain months only to have them shot by market gunners in other States and sold in our own as well as other markets. Such a law would injure no one except the man who pursues birds for a living, the man who kills the goose that lays the golden egg, the man who exterminates the birds. The time is gone by in Massachusetts and in the east when any man should be allowed to live by the killing of birds and game. This killing birds for gold should be stopped for the benefit of the whole people. We should no longer be allowed to exterminate, and thus deprive posterity of its birth-right in the birds and game.

The market hunter or pot hunter is often a good and worthy citizen, but his day is past and he must adopt some other calling. More than forty States now prohibit the sale of all or a part of their game. Massachusetts should have been among the leaders in this movement.

Next in importance to the elimination of the market hunter comes the bag limit. Some so-called sportsmen are nearly as destructive as the market hunter, but many who now kill so long as their ammunition lasts would respect a legal limit to the number of birds to be killed in a day or in a season.

Right of Search.

The Commissioners on Fisheries and Game and their deputies should be given the power of search without a warrant. This power can be exercised without abuse as it now is in other States. There can be little hope of thorough enforcement of the law until the officers who enforce it have this power.

The Sanctuary.

Where all other measures promise only failure there is still one resource left, and that is the setting aside of tracts or reservations of woodland, lake, river or shore within the limits of which all killing

of birds by man may be prohibited, under heavy penalties. In such tracts or reservations the resident game and birds can breed unmolested, and can replenish the surrounding country. Here migrants can find safety to stop and rest from their long journeys.

A chain of such sanctuaries established along the Atlantic coast of North America would probably preserve our stock of wild fowl and shore birds indefinitely. The sanctuary has succeeded in Europe, and it is no new idea here. Already in Massachusetts we have been experimenting with it in a small way. One modification of the plan is to forbid the taking or killing of all wild animals or all birds within certain limits, after the plan adopted on Cape Ann in 1897 and in the town of Essex in 1899. In these cases a time limit of five years was set; but such an act might be made perpetual. Park commissioners are given police powers, and can prevent shooting within the limits of their reservations, as the Metropolitan Park Commission and many city park commissioners now do. In 1899 3,000 acres of land were set aside on Wachusett Mountain as a State reservation, and the commissioners in charge were given police powers; this should ensure a permanent game sanctuary for Worcester County. The enactment in 1907, by which the Commissioners on Fisheries and Game were empowered to take 1,000 acres of land on Martha's Vineyard as a reservation for the protection of the heath hen and other birds, is an example of direct legislation for this purpose, more of which will, sooner or later, become necessary.

While efforts should not be relaxed to secure beneficent protective legislation, the most important work that can be done by the bird protectionist is to strive to influence public sentiment regarding the necessity for such enactments, for laws can never be fully enforced until they are respected by the people.

SERIES OF 1907. VOL. 20. NO. 6.

MASSACHUSETTS

CROP REPORT

FOR THE

MONTH OF OCTOBER, 1907.

GREENHOUSE PESTS.

ISSUED MONTHLY, MAY TO OCTOBER, BY STATE BOARD OF AGRICULTURE, STATE HOUSE, BOSTON, MASS.

J. LEWIS ELLSWORTH, *Secretary.*

ENTERED JUNE 3, 1904, AT BOSTON, MASS., AS SECOND-CLASS MATTER, UNDER ACT OF CONGRESS OF JUNE 6, 1900.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1907.

Approved by

The State Board of Publication.

Crop Report for the Month of October, 1907.

Office of State Board of Agriculture,
Boston, Mass., Nov. 1, 1907.

Bulletin No. 6, Crop Report for the month of October, the final issue of the season, is herewith presented. We wish to thank our correspondents for their faithful and painstaking assistance, so freely given and cheerfully maintained. We regret that it is not in our power to reward them more substantially, but can assure them that their efforts have been of great value in the work of the Board. It is our hope that all of them will be in a position to assist us in the same manner with the coming of another spring.

The special articles printed this year have been: Bulletin No. 1, "Corn as a grain crop in Massachusetts," by Prof. Wm. P. Brooks; Bulletin No. 2, "Plum culture in Massachusetts," by Prof. F. A. Waugh; Bulletin No. 3, "Hatching and rearing chicks by natural methods on the farm," by John S. Robinson; Bulletin No. 4, "Bee keeping: some suggestions for its advancement in Massachusetts," by Burton N. Gates; and Bulletin No. 5, "Statutory bird protection in Massachusetts," by Edward Howe Forbush. We have a limited number of Bulletins Nos. 1, 2, 4 and 5 on hand, which we shall be glad to send to any one desiring them. The supply of Bulletin No. 3 is entirely exhausted, but we shall reprint the article on hatching and rearing chicks by natural methods, and any requests for the same will be placed on file and filled when the reprint is issued.

Particular attention is called to the article at the close of this bulletin, on "Greenhouse pests and their control," by Dr. H. T. Fernald, professor of entomology at the Massachusetts Agricultural College. The greenhouse industry is a large and growing one in Massachusetts, and deserving of more attention than we have been able to pay to it up to the present time. In offering this article we feel that we are doing much to make up for any seeming previous neglect, as there is no one more competent to write on insect pests

of any kind than Dr. Fernald, and the control of such pests as prove destructive in the greenhouse is of importance to every owner in the State.

Progress of the Season.

The Crop Reporting Board of the Bureau of Statistics of the Department of Agriculture (Crop Reporter for October, 1907) finds the condition of corn on October 1 to have been 78, as compared with 80.2 a month earlier, 90.1 in 1906, 89.2 in 1905, and a ten-year average of 79.6. The preliminary estimate of the average yield per acre of spring wheat was 13.1 bushels, which compares with 13.7 bushels as finally estimated in 1906, 14.7 in 1905, and a ten-year average of 14 bushels. The production of spring and winter wheat combined is about 625,567,000 bushels, compared with 735,260,970 bushels as finally estimated a year ago.

The average yield of oats is indicated to be about 23.5 bushels per acre, as compared with 31.2 bushels finally estimated in 1906, 34 bushels in 1905, and a ten-year average of 30.1 bushels. A total yield of about 741,521,000 bushels is thus indicated, as compared with 964,904,522 bushels finally estimated in 1906. The average quality is 77, against 88.2 in 1906, 92.4 in 1905, and 91.4 in 1904.

The preliminary estimate of yield per acre of barley is 23.9 bushels, against 28.3 bushels in 1906, 26.8 in 1905, and a ten-year average of 25.5 bushels. A total production of 147,192,000 bushels is thus indicated, as compared with 178,916,484 bushels in 1906. The average quality is 88.1, against 89.1 in 1906, 86.2 in 1905, and 88.7 in 1904.

The preliminary estimate of yield per acre of rye is 16.4 bushels, against 16.7 bushels as finally estimated in 1906, 16.5 bushels in 1905, and a ten-year average of 15.7 bushels. A total production of 31,566,000 bushels is thus indicated, as compared with 33,374,833 bushels in 1906. The average quality is 91.6, against 94.1 in 1906, 92.6 in 1905, and 91.6 in 1904.

The preliminary estimate of yield per acre of hay is 1.44 tons, against 1.35 tons as finally estimated in 1906, 1.54

tons in 1905, and a ten-year average of 1.43 tons. A total production of 61,420,000 tons is thus indicated, as compared with 57,145,959 tons finally estimated in 1906. The average quality is 90.5, against 89.9 in 1906, 89.8 in 1905, and 92.7 in 1904.

The average condition of buckwheat at time of harvest was 80.1, as compared with 77.4 a month earlier, 84.9 a year ago, 91.6 in 1905, and a ten-year average of 82.9.

The average condition of potatoes on October 1 was 77, as compared with 80.2 a month earlier, 82.2 in 1906, 74.3 in 1905, and a ten-year average of 74.7.

The average condition of tobacco at time of harvest was 84.8, as compared with 82.5 September 1, 84.6 a year ago, 85.8 in 1905, and a five-year average of 81.7.

The average condition of corn in Massachusetts on October 1 was 84; the average yield of oats 35 bushels, and the quality 87; the average yield of rye 16.5 bushels, and the quality 95; the average condition of buckwheat when harvested 85; the average condition of tobacco when harvested 89; the average yield per acre of hay 1.30 tons, and the average quality 93; the production of clover seed compared with a full crop 85; the average condition of potatoes 80; the production of beans 79; the production of cabbages 85; the production of onions 80; the production of tomatoes 85; the average condition of apples 50; and the average condition of cranberries 75.

Massachusetts Weather, 1907.

[Furnished by Weather Bureau, Boston.]

The weather of January was of mid-winter type, without especial features. There were the usual number of storms of average severity, with rain and snow, the monthly amounts being somewhat below the average. Some of the storms were accompanied by high winds and gales. The mean temperature, 29.4°, was 1° below normal. The weather was very cold during the last decade of the month.

The low temperatures continued through February, the month being one of the coldest Februarys on record, though the extremes did not depart greatly from previous years.

The precipitation was nearly all snow, the total ranging from 11 to 36 inches. A severe storm on the 5th was accompanied by gales of from 60 to 70 miles per hour. The month as a whole was a very severe one.

The weather of March was more moderate than usual, with only two severe storms. The average temperature ranged from 1° to 4° above the average for March. The minimum temperatures of the first decade were low, and the maximum temperatures during the closing days were high for the season. At the close of the month the ground was free from snow.

April as a whole was very unseasonable, with weather conditions more like March than April. The monthly average temperature was from 1° to 4° below the April normal. There was much cloudiness and a heavy fall of snow, from 2 to 18 inches, on the 8th, 9th and 10th. The month closed with the season from ten days to a fortnight later than usual.

May opened with seasonable weather, but there was a marked drop in temperature, and it continued very cool until the 9th. From the 10th to the 20th the weather was seasonal. The remainder of the month was unusually cool, light to moderate frosts occurring on several nights. There was also a deficiency of sunshine for the month, although the monthly precipitation was generally deficient in amount. The month was one of the most unpleasant of its name.

Unseasonably cool weather continued until June 15. From that date to the close of the month the daily temperatures were generally above the normal. There was much cloudy, unsettled weather during the first two weeks. The last half of the month was quite dry, the rainfall being light and irregularly distributed. There was also much sunshine, and by the 25th there was general need of rain. Owing to uniformly cool weather during the first half of the month, there were very few thunderstorms, but during the rest of the month they occurred with average frequency.

The weather of July was seasonal, with abundant sunshine and uniformly high temperatures through the entire month. The monthly means were from 1 to 1½ above the

July normal. The per cent of humidity was generally high, and the weather oppressive. The rainfall was very unevenly distributed, resulting from local storms, the showers as a rule occurring in the afternoon or night. The weather of month was generally ideal for the mid-summer season.

The weather for August as a whole was marked by an absence of cloudiness, an unusual amount of sunshine and a great deficiency in rainfall. Except in a few localities the rainfall for the month was less than 1 inch, making it the driest August, with the exception of 1883, during the past thirty-six years. Although there were less than the usual number of days with a high maximum temperature, the average temperature of the month was somewhat above the normal.

From the 2d to the 5th of September a heavy rainfall throughout the State effectually relieved the drought that had prevailed during July and August. Occasional showers fell until the 11th, and from the 12th to the 20th fair and generally clear weather prevailed. From the 5th to the 24th, with the exception of three or four days, the temperature was much above the normal, and much like that usual in August. From the 25th to the close of the month the temperature was lower and somewhat below the normal, frost occurring in some localities on the night of the 25th.

Weather of October.

The month as a whole was exceptionally pleasant, there being much fair, sunny weather, with many days of the Indian summer type, and moderate temperatures, generally near the seasonal average. Two well-defined storms of considerable intensity passed over the State. The first one was on the 8th, when general and heavy rains fell in all sections, and high winds to strong southerly and westerly gales prevailed along the coast. Much delay and some damage from the violent winds resulted to shipping. The rains were generally beneficial, there still being a deficiency in the rainfall for the season in nearly all sections. The second storm was on the 28th–29th. This disturbance also

caused dangerous gales along the coast, although there was little damage to shipping. The rainfall during this storm was quite general, but the amounts were not excessive. Light rains fell on the 4th and on the 20th. There were no extremes of temperature, but the daily means were slightly below the average for a good portion of the month, and the average of the month was about 2° below the October normal. A well-defined cool wave prevailed on the 21st–22d, during which killing frosts occurred in all except immediate coast sections, with light to moderate freezes in interior sections of the State. The weather of the month was exceptionally favorable to harvesting and housing of crops, to fall pasturage and to all out-door pursuits.

Crops of the Year.

May was cloudy and unpleasant, with several light to severe frosts. Pastures and mowings wintered well, and started slowly, owing to cold weather, but with the seasonal rains promised well for the future. The apple bloom was an average one for an off year, but pears and plums made a light bloom, cherries a fair bloom and peaches a very light one. Small fruits and berries bloomed well. Little damage from frost was reported. Few insects appeared, and little damage was reported. Planting progressed slowly, owing to the late season and cold weather. Farm help was unusually scarce; average wages, $22 per month with board, with $1.50 per day as the minimum without board. The acreage of cultivated crops seemed certain to be somewhat reduced, the reduction being most marked in corn and potatoes, owing to scarcity and high price of help.

Insects were not plenty during June, and did little damage. Indian corn was late, being late in planting, and very backward and uneven, owing to failure to germinate in many cases, but of good color. Haying had not commenced at time of making returns, with a good crop expected except in the hill towns, where it was said to be thin and light. There was about the usual acreage of early potatoes, but they were very backward and uneven. Early market-garden crops were much later than usual, with very little coming into the market in June. The flow of milk was well maintained,

with prices generally better than in former years. Dairy cows were in fair supply, with good ones bringing higher prices. Pastures were generally in good condition, but needing rain. Strawberries were very late, but promised a fair crop; practically no peaches; currants promised well; pears and plums light; apples set well, but late; cranberries late in blooming.

Insects were less troublesome and numerous than usual in July. Indian corn was growing very rapidly, but much later than usual. Haying was not entirely completed, and the crop was generally reported to be above the average, and of excellent quality. There was perhaps a slight falling off in the acreage of forage crops. Market-garden crops were late, but yielding well, and bringing average prices. Potatoes were late and not very promising. Apples promised only a light crop; pears and plums light; no peaches; quinces good; grapes promising; cranberries bloomed very full, but rather backward. Pastures were dry and brown in southeastern sections, but green and growing elsewhere. Rye, oats and barley were about normal crops.

Indian corn came forward rapidly during August, but further warm weather was still essential to its maturing. It suffered somewhat from dry weather during the month. Rowen promised only a very light crop, owing to dry weather. Late potatoes promised only a light crop, with some blight and rot. There was about the same acreage of tobacco as in 1906, but the crop was backward and unpromising, though early fields were in good condition. Pastures were in very poor condition, especially in eastern sections. Apples were small and backward, and had dropped badly; there were practically no peaches and very few pears; grapes a fair crop; quinces few and unpromising; cranberries a light crop, owing to drought. Oats were an average crop, but late-sown barley was making little progress. Root crops were reported as grown in eastern sections for the market, but only to a limited degree for stock feeding in any section.

The rains and warm weather of September benefited corn materially, and a fair crop was in prospect. Rowen was a light crop in all sections. Feed in pastures improved during

the month to a marked degree. Mowings were green and luxuriant, even on light land, but with little growth of hay in most cases. Very much less than the usual amount of fall seeding was done, owing to the prolonged drought. Onions were hardly a normal crop, being smaller than usual. Potatoes were considerably under the normal in yield, and of small size but good quality. Root crops were generally backward, and not up to the normal. Celery also was a light crop, and late market-garden crops of all kinds were backward, but with prices generally higher than usual. Apples were reported as somewhat better than expected; pears the poorest crop for years; peaches nearly a total failure; grapes a fair crop, but late in maturing; cranberries late in maturing, and a light crop. It appears that not enough apple trees are set out each year to make good the yearly loss in many sections.

In the circular to correspondents returnable October 26 the following questions were asked: —

1. What is the value of the corn crop compared with a normal crop?
2. Have root crops proved to be average crops?
3. What is the condition of farm stock?
4. What is the condition of fall seeding?
5. How have prices for crops raised for market compared with former years?
6. Which of the leading crops in your locality do you think have been most profitable?
7. Which of the leading crops in your locality do you think have been least profitable?
8. Considered as a whole, has the season been a profitable one for your farmers?

Returns were received from 133 correspondents, from which the following summary has been made: —

Value of the Corn Crop.

The corn crop was considerably below the normal in value, both for grain and stover, and this in spite of the unusually high prices which formed the basis of computation. The

crop came forward rapidly during September, and much more of it matured than seemed possible, considering the unfavorable weather of the summer. Nevertheless, there was a considerable portion of the crop which was damaged by frost, and much more which was cut before maturity to avoid that danger. Some report that there were practically no ears. Corn raised for the silo also failed to mature properly, and was much under the normal in value, though nearer to normal than that raised for grain and stover.

Root Crops.

Root crops are considerably below the average, as they did not get a proper start, owing to the drought of August. They have generally brought good prices where raised for market. Turnips especially are reported as small and unsatisfactory in yield and quality. Potatoes did not rot as badly as was indicated, but the crop was light, owing to poor germination and drought. They are selling for good prices.

Farm Stock.

Pastures improved during October, and at date of making returns the feed was unusually good for the time of year. However, farm stock is, on the whole, rather thin in flesh, especially in eastern sections, where the drought was most severe. The flow of milk was well maintained, but with an increased amount of grain, and, in many cases, inroads on the winter's stock of hay.

Fall Seeding.

Very much less than the usual amount of fall seeding has been done, owing to dry weather during August, and frequent rains, badly interrupting farm work, during September and October. Most of that put in was sown later than usual, and is slow in starting. There appears to be a good catch on most fields.

Prices.

Prices for crops raised for market range a good deal higher than in former years, due in a large measure to shortages of most of the leading crops. Of the 128 correspondents answering this question 5 speak of prices as average, 9 as good, and 114 as higher than usual.

Most Profitable Crops.

Seventy-one correspondents, more than a majority, consider hay to have been among the most profitable crops; 39, potatoes; 14, corn; 13, apples; 8, cranberries; 7, onions; 5, cabbages; 4, sweet corn; 3, tomatoes; 2, strawberries; 2, cauliflower; 2, asparagus; 2, oats; 2, fodder crops; 1, dairy products; 1, milk; 1, tobacco; 1, cucumbers; 1, berries; 1, lettuce; 1, squashes; 1, parsnips; 1, beans; 1, turnips; and 1, beets.

Least Profitable Crops.

Thirty-nine correspondents, about one-third of those replying, report that corn is among the least profitable crops; 35, potatoes; 8, apples; 6, cabbages; 6, small fruits; 4, rowen; 4, squashes; 4, turnips; 3, oats; 3, hay; 3, onions; 3, beans; 3, peaches; 3, root crops; 3, tomatoes; 3, milk; 2, peas; 2, beets; 1, garden truck; 1, buckwheat; 1, tobacco; 1, asparagus; 1, grapes; 1, pears; 1, plums; 1, lettuce; 1, celery; 1, strawberries; 1, cucumbers; 1, carrots; and 1, cranberries.

Profits of the Season.

The season does not appear to have been a particularly profitable one for our farmers. Crops have not been especially good, and while prices received have been high, grain and everything which the farmer has to buy has also been above the normal in price. Of the 128 correspondents answering this question, 45 consider the season to have been a profitable one, 21 an average season for profit, 6 that there has been a small profit, 18 that it has been fairly profitable, while 5 say that it has not been very profitable and 33 that it has been an unprofitable one.

NOTES OF CORRESPONDENTS.

(Returned to us October 26.)

BERKSHIRE COUNTY.

New Marlborough (Edward W. Rhoades). — Corn is the poorest crop for many years, with very few ears. Root crops are up to the average. Farm stock looks well, but will have to be fed from the barn earlier than usual. Very little fall seeding has been done. Prices of market crops are the best in years. Rye has been our most profitable crop, and potatoes our least profitable one. The season has not been a profitable one, as the growing season was too short and running expenses too high.

Lee (A. Bradley). — Corn is within 10 per cent of a normal crop in value. Root crops are nearly up to the average. Farm stock is in first-class condition. No fall seeding has been done. Prices for market crops are 10 per cent higher than usual. Hay has been our most profitable crop. The season has been an average one for profit.

West Stockbridge (J. S. Moore). — Indian corn is about a three-fourths crop. Root crops have proved to be average crops. Farm stock is looking well. Fall seeding is in good condition. Prices for crops raised for market have been much better than usual. Hay and potatoes have been our most profitable crops, and corn and oats our least profitable ones. Considered as a whole, the season has been a profitable one. If it were not for the scarcity of good farm help, farming would be a most prosperous and independent business. The market for milk created by the Borden milk factory has resulted in farmers keeping better stock, and the sanitary conditions exacted have resulted in stock being in better condition than it usually is. Apples are an uneven crop, fair in some sections and poor in others.

Richmond (Timothy B. Salmon). — Indian corn is about one-fourth of a normal crop in value. Root crops are up to the usual average. Farm stock is in fair condition. No fall seeding has been done. Prices for market crops are higher than those received in former years. Hay has been our most profitable crop, and corn our least profitable one. Considered as a whole, the season has given a small profit for our farmers.

Hinsdale (Thomas F. Barker). — Corn is not over three-fourths of a crop. Root crops are not up to the usual average in condition. Farm stock is in very good condition. No fall seeding has been done.

Prices for crops raised for market have increased 10 per cent over former years. Potatoes and oats have been our most profitable crops, and garden truck our least profitable. The season has been about an average one for profit, but the high price of everything they buy makes our farmers feel blue.

Windsor (H. A. Ford). — The corn crop has all been put into the silo, none having ripened. Root crops are in the best condition for years. Farm stock is in good condition. Fall seeding is in good condition. Prices for market crops are as good as ever, if not better. Potatoes have been our most profitable crop. Considered as a whole, the season has been a profitable one for our farmers. Three inches of snow fell on October 20.

Cheshire (L. J. Northup). — The corn crop is estimated to be about half a normal crop in value. Root crops are normal crops. Farm stock is in fair condition. There is not much fall seeding, but that which has been put in looks well. Crops raised for market have brought good prices. The hay crop has been our most profitable crop. It is hard to say what crop has been least profitable, all having been good. The season as a whole has been a profitable one.

Savoy (Willis W. Burnett). — The value of the corn crop is perhaps a fourth or a third that of a normal crop. Root crops are about three-fourths of an average yield, turnips not yet harvested. Farm stock is in fair condition. But little fall seeding has been done. Prices for crops raised for market are above the average. Hay has been our most profitable crop, and corn our least profitable one. Considered as a whole, the season has been a fairly profitable one. The acreage of corn was much less than usual, and it failed to mature well.

Williamstown (S. A. Hickox). — Indian corn is about three-fourths of a crop. Roots are good average yields. Farm stock will come to the barn in fine condition. Fall seeding shows about a normal stand. Prices for crops raised for market have ranged better than usual. Oats have given a good yield and brought extra prices. Oats are our most profitable crop, and corn our least profitable one. Considering the cold spring and dry summer, the season has been a profitable one.

FRANKLIN COUNTY.

Monroe (David H. Sherman). — Indian corn is little raised, and is mostly put into the silo, being late and poorly matured. Potatoes are a good yield, of good quality; other roots below average. Farm stock is in very fair condition. Fall seeding has been but little done. Prices for crops raised for market have been above average. Hay, potatoes and apples have been our most profitable crops, and corn our least profitable one. Considered as a whole, the season has been above an average one for profit.

Shelburne (George E. Taylor). — The corn crop is not over two-thirds of the normal in value. Root crops are up to the usual average.

Farm stock is in fine condition. Prices for crops raised for market have been somewhat above those of former years. Hay has been our most profitable crop, and corn our least profitable one. Considered as a whole, the season has not been a profitable one for our farmers.

Bernardston (R. H. Cushman). — Many pieces of field corn were up to an average yield; others not well matured, and growth of fodder not large. Potatoes were a good crop; other crops poor. Pastures improved after the rains, and stock is in fair condition. Fall seeding is looking well. Hay, apples, potatoes and dairy products find ready sale, at fairly good prices. The increased expenses for farm operations do not leave us a very profitable season.

Gill (F. F. Stoughton). — Indian corn is about seven-eighths of a full crop in value. Owing to the drought in August, young stock in pastures became quite thin. Prices for crops raised for market have been somewhat higher than usual. Hay, corn and potatoes have been our most profitable crops, and apples and rowen our least profitable ones. Considered as a whole, the season has not been a very profitable one for our farmers.

Whately (C. L. Crafts). — Indian corn is about half a normal crop in value. Root crops are about up to the usual average. Farm stock is in very good condition. Fall seeding is in good condition. Onions are our most profitable crop to date, tobacco not being ready for sale, and potatoes our least profitable one, they having rotted badly. If tobacco sells for a fair price, the season will be profitable.

Montague (A. M. Lyman). — Indian corn is about a three-fourths crop. Root crops have proved to be average crops. Farm stock is in very fair condition. Fall seeding is in excellent condition. Prices for crops raised for market have been average. Tobacco and onions have been our most profitable crops, and potatoes have yielded well, while hay has been our least profitable one. There were no good crops of hay except on new-seeded fields and top-dressed mowings, and rowen did not pay for cutting elsewhere. There is not much margin for profit, with the present high price of grain.

Northfield (T. R. Callender). — Corn is not as heavily eared as usual, but at present prices the crop is 20 per cent more valuable than usual. Root crops are rather above average in condition. Farm stock is in fine condition, and late feed is good. Early fall seeding is looking well. Prices for market crops have ruled above the average of former years. Cucumbers and corn have been our most profitable crops, and potatoes our least profitable crop, owing to rot. The season has been a profitable one, prices ruling high and crops maturing well, though late, owing to the long season.

Erving (Charles F. Clark). — The corn crop is two-thirds of the normal in value. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is looking poorly. Prices for crops raised for market have been higher than usual. Potatoes and

hay have been our most profitable crops, and corn our least profitable one. Considered as a whole, the season has been a profitable one for our farmers.

Orange (A. C. White). — The fall rains and warm weather helped the corn crop to mature. Root crops are up to the usual average. Farm stock is in normal condition. But very little fall seeding has been done. Prices for all crops are higher than usual. Dairy products have not kept pace with the rise in price of dairy feed, but as a whole the season will compare favorably with other years.

HAMPSHIRE COUNTY.

Prescott (W. F. Wendermuth). — Indian corn is a good average crop. Root crops are up to the usual average. Farm stock is in fair to good condition. Fall seeding is in excellent condition. The prices of most farm crops are much advanced over former years. Corn, hay and forage crops have been our most profitable crops. Perhaps no crops have been unprofitable, but potatoes are the least profitable, owing to rot. Grain has been high and labor almost impossible to secure at any price, but the season has nevertheless been a profitable one.

Enfield (D. O. Chickering). — The corn crop is somewhat below the average in value. Potatoes have been troubled with dry rot. Farm stock is in good condition. But very little fall seeding has been done. Prices for crops raised for market are above the average of former years. Hay has been our most profitable crop, and corn our least profitable one. Considered as a whole, the season has been a profitable one for our farmers.

Belchertown (H. C. West). — Indian corn is 95 per cent of a normal crop in value, the season being a little too short for best results. Root crops are nearly 25 per cent below the average. Farm stock is in fairly good condition, though pastures have been short. Fall seeding is in very good condition. Potatoes, hay and corn have been our most profitable crops. The season has been a profitable one, slight shortages in some crops being balanced by increases in others.

Amherst (Wm. P. Brooks). — Indian corn is rather below the normal in value, as it ripened imperfectly, and there is much immature and frosted ensilage corn. Root crops are unimportant, but are good as far as grown. Farm stock is in excellent condition. Fall seeding is in good condition. Hay and apples bring very high prices; squashes high; tobacco unsold; other crops as usual. Hay, apples and onions have been our most profitable crops, and potatoes our least profitable ones. The season will be a profitable one if tobacco sells at a fair price.

Hadley (H. C. Russell). — Indian corn is 80 per cent of a full crop in value. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. The prices re-

ceived for market crops are a little higher than usual. Onions are our most profitable crop, and potatoes our least profitable one. Considered as a whole, the season has been a profitable one for our farmers.

Hatfield (Thaddeus Graves). — Corn is a three-fourths crop. Root crops are about normal crops. Farm stock is a little thin, as pastures did not fully recover from the dry weather. Fall seeding is in good condition. Prices for crops raised for market are 10 per cent above the normal. Onions are our most profitable crop, and potatoes our least profitable one, having been affected by blight and rot. The season has not been as profitable as usual.

Southampton (C. B. Lyman). — The corn crop is below the normal in value. Root crops are not up to the usual average. Farm stock is in fairly good condition. Fall seeding is later than usual. Prices for crops grown for market have ruled above the average. Hay has been our most profitable crop, and dairying has been our least profitable branch of farming. Tobacco is unsold as yet, but a good crop.

Westhampton (Levi Burt). — Indian corn is two-thirds of a full crop in value. Root crops are up to the average in condition. Farm stock is looking well. Fall seeding is in good condition. Potatoes bring 80 cents per bushel, and apples $2.50 per barrel. Apples are our most profitable crop. The season has been a profitable one, as we had a full hay crop, and the extra returns on apples and potatoes will more than make up for the shortage in corn and rowen.

Chesterfield (Horatio Bisbee). — Corn is about 80 per cent of a full crop in value, both for grain and silage. Root crops have proved to be average crops. Farm stock is in fairly good condition. Fall seeding is not quite up to the normal. Hay has been our most profitable crop, and corn our least profitable one. Prices have been good for what the farmer has to sell, and the season has been a profitable one as a whole. Apples have proved to be a good crop in this section. The greatest drawback the farmer has to contend with is the scarcity of help.

HAMPDEN COUNTY.

Russell (E. D. Parks). — The corn crop is about two-thirds of a normal crop in value. Root crops are about average, rather below, if anything. Farm stock is looking about as usual. But little fall seeding has been done so far, but what has been put in looks well. Prices for market crops have been rather above the normal. Hay and potatoes have been our most profitable crops, and fruits and corn our least profitable ones. With high prices, the season has been about an average one for profit.

Agawam (J. G. Burt). — The corn crop is above the normal in value. Root crops have proved to be average crops. The condition of farm stock is good. Fall seeding is in good condition. Prices for crops raised for market have been better than usual. Hay, corn and potatoes have been our most profitable crops, and tobacco and onions

our least profitable ones. Considered as a whole, at the present prices of help and feed the season is about an even thing.

West Springfield (N. T. Smith). — Indian corn is about a three-fourths crop. Root crops are below average, on account of drought. Farm stock is in very fair condition. Fall seeding is in good condition, but less than the usual amount has been done. Prices for farm crops have been slightly above the usual average. Potatoes have been our most profitable crops, and apples our least profitable one, as the crop is only sufficient for local needs. The margin of profit is small for most farmers, on account of the shortage of some crops and the unusually high prices of grain. Market gardening has been very profitable.

Chicopee (E. L. Shaw). — The corn crop is a little below the normal in value, as some fields have not eared well. Root crops are about average. Farm stock is in good condition. Fall seeding is in excellent condition. Prices for crops raised for market have ruled a little higher than usual. Hay and cabbages have been our most profitable crops, and potatoes our least profitable one. The season would seem to be a fairly profitable one, if crops sell as they now bid fair to.

East Longmeadow (John L. Davis). — Indian corn is about a two-thirds crop, but is normal in value, on account of the high price. Root crops are uneven, some normal and others failures. Farm stock is not in very good condition. Not much fall seeding was done early, but it is in good condition. Prices for farm crops have been better than normal. Hay has been our most profitable crop, and potatoes our least profitable one. The season has not been a profitable one, the cost of what the farmer has to buy being out of all proportion with the prices he is selling for.

Hampden (John N. Isham). — Indian corn is about three-fourths the value of a normal crop. Root crops are a little below the average. Farm stock is in good condition. Fall seeding is backward in starting, but is growing finely. Prices for crops raised for market have been better than in former years. Hay and apples have been our most profitable crops, and corn and potatoes our least profitable ones. Apples and nuts are a little smaller than usual, probably owing to drought. The returns of the season have been in most cases satisfactory, even if the conditions have not been as favorable as usual.

Wilbraham (H. M. Bliss). — The corn crop is 10 per cent below the normal in value. Root crops are not quite up to the average. Farm stock is in first-class condition. Fall seeding is in only fair condition. Prices for farm crops have been very good, owing to scarcity of crops. Grass and potatoes have been our most profitable crops, and peaches and apples our least profitable ones. Considered as a whole, the season would have been profitable except for the scarcity of help and high prices of grain.

Palmer (O. P. Allen). — The corn crop is rather less than the normal

in value. Root crops are proving to be average crops. Farm stock is in quite good condition. Fall seeding is in fair condition. Prices for crops raised for market have been higher than usual. Potatoes have been our most profitable crop, and corn our least profitable one. The season has been a profitable one, partly because of higher prices for products.

WORCESTER COUNTY.

Dudley (J. J. Gilles). — The corn crop is 50 per cent below the normal in value. Root crops are not up to the usual average. Farm stock is not in better than fair condition. Very little fall seeding has been done. Prices for crops raised for market have been 20 per cent higher than usual. Hay has been our most profitable crop, and corn our least profitable one. Our farmers are not agreed as to whether the season has or has not been a profitable one.

Brookfield (Frank E. Prouty). — Indian corn is about two-thirds of a normal crop in value. Root crops are not up to the usual average. Farm stock is in good condition. Fall seeding is backward. Prices for crops raised for market are above the average. Hay has been our most profitable crop, and corn our least profitable one. Considered as a whole, the season has been an average one for profit.

North Brookfield (John H. Lane). — Corn as a grain crop is not worth more than 25 per cent as much as usual, but it is better for fodder, being possibly half a crop. Farm stock is in good condition where enough grain has been fed. Fall seeding is in good condition. Prices for crops raised for market are higher than usual. Hay has been our most profitable crop, but short pastures have cut into the winter's supply. Corn has been our least profitable crop. Considered as a whole, the season has perhaps been a profitable one.

Oakham (Jesse Allen). — Indian corn is about half a crop in value. Root crops are up to the usual average. Farm stock is rather thin. Fall seeding is looking well. Prices for crops raised for market have been a little better than in former years. Potatoes and milk have been our most profitable products, and corn our least profitable one. The season has been a fairly profitable one. Stock has not recovered fully from the effects of the summer drought.

Petersham (B. W. Spooner). — The corn crop is about two-thirds of a normal crop in value. But few root crops are raised here. Considering the dry season, stock is in fair condition. Very little fall seeding has been done here. Prices for crops raised for market have been fully as high as usual. Hay has been our most profitable crop, and potatoes and corn our least profitable ones. About all we raise here goes to the cows, and some are discouraged at the low price of milk and cream, and will sell their dairies.

Royalston (C. A. Stimson). — Indian corn is 78 per cent of a normal yield in value. Root crops are not up to the normal. Farm stock is n fair condition. Fall seeding is in good condition. Prices for crops

raised for market have ruled higher than usual. Potatoes have been our most profitable crop, and corn our least profitable one. Considered as a whole, the season has not been a profitable one for our farmers.

Gardner (W. E. Knight). — The corn crop is 15 per cent below the normal in value. Root crops are average yields. Farm stock is in good condition. Fall seeding looks well. Crops have brought higher prices and have cost more to produce than usual. Hay has been our most profitable crop, and potatoes our least profitable one. Considered as a whole, the season has been a fairly profitable one.

Ashburnham (E. D. Gibson). — Corn is a two-thirds crop. Root crops are giving average yields. Farm stock is in good condition. No fall seeding has been done hereabouts. Prices for crops raised for market have compared well with former years. Potatoes have been our most profitable crop, and corn our least profitable one. Considered as a whole, the season has been a fairly profitable one for our farmers.

Harvard (John S. Preston). — The corn crop is not quite up to the average of former years. Root crops are quite good. Farm stock is looking very well, and will come to the barn in good condition. Fall seeding is looking well. Prices for crops raised for market have been a little better than in most years. Hay is our best crop, corn and potatoes bring good prices, and apples are a good crop this year. As a whole, the season is an average one for profit; hay and grain are very high, but milk brings nearly double what it did from six to ten years ago.

Northborough (John K. Mills). — The corn crop is not large, but owing to high prices, it is up to the normal in value. Root crops are below the average, but of good quality. Farm stock is looking well, and will come to the barn in good condition. There has been but little fall seeding done, but it is looking well. Prices for market crops have been somewhat higher than in former years. Potatoes, hay, corn, apples, cabbages, strawberries and onions have been our most profitable crops. Beans, asparagus, peas, tomatoes, grapes, pears, plums and squashes have been our least profitable crops. While most farmers will make both ends meet, actual profits will be small.

Shrewsbury (Fred J. Rice). — The value of the corn crop is small, as compared with a normal crop. Root crops are giving average yields. Farm stock is in very good condition. Fall seeding is in fair condition. Prices for crops raised for market have been little higher than usual. Tomatoes have been our most profitable crop, and cabbages our least profitable one. The season has been a fair one for our farmers.

Auburn (Wm. Gilbert). — Corn is 80 per cent of a full crop in value. Root crops have done very well this season. Farm stock is thin. Fall seeding looks well. Prices for market crops have been above the normal. Potatoes have been our most profitable crop, and cabbages

our least profitable one. The season has been a very fair one for profit with us.

Blackstone (O. F. Fuller). — The corn crop is worth more than usual, when compared with the price of grain. Root crops are about average crops. Fall seeding is in good condition. Farm stock is in fair condition. Crops raised for market have brought a little higher prices than in former years. Tomatoes have been our most profitable crop. A number of our leading crops were injured by the drought. The season is no more profitable than usual, owing to the high price of farm help and grain.

MIDDLESEX COUNTY.

Sherborn (C. O. Littlefield). — Indian corn is about two-thirds of a good full crop in value. Root crops are not up to the average. Farm stock is much improved since the fall rains have started up feed. The small amount of fall seeding done looks very well. Average prices of crops raised for market have been a little higher than in previous years. Potatoes have been our most profitable crop, and fruit our least profitable one, all kinds being short, and peaches a total failure. The season has not been a profitable one, owing to the bad weather, the scarcity of good help and the high price of grain and other things which the farmer has to purchase.

Hopkinton (W. V. Thompson). — Corn is from one-half to two-thirds of the value of a normal crop for ensilage and one-fourth for field corn. Root crops are about one-fourth yields in this vicinity. Farm stock is looking well. Not much fall seeding has been done, but that put in is looking well. Prices for market crops have been very little higher than usual. Hay is an extra good crop, and potatoes a good crop. Field corn, squashes, fruits and rowen have been our least profitable crops. The season has not been a profitable one.

Stow (George W. Bradley). — The value of the corn crop is not quite up to the normal. Root crops are in fair condition. Farm stock is looking very well. Most seeding was done so late that it has not started sufficiently to note condition. As a rule, prices for crops raised for market have averaged higher than usual. Hay has been our most profitable crop, and fruits our least profitable one. Considered as a whole, the season has been a profitable one for our farmers.

Maynard (L. H. Maynard). — The corn crop is medium, and was fully up to the average on low land, but suffering on high land from drought. Farm stock is in very good condition, the recent rains having improved the pastures. Fall seeding is in fair condition, but is uneven. Prices for farm crops have been a little better than in former years. Hay has been our most profitable crop, and rowen our least profitable one. While the season has been a peculiar one, as a whole it has been profitable for most farmers.

Townsend (G. A. Wilder). — The corn crop is fully equal to a

normal crop in value. Root crops are good average crops. Farm stock is in good condition. Not as much fall seeding as usual has been done, but it has made a good showing thus far. Prices for market crops are higher than usual. Apples and potatoes have been our most profitable crops, and small fruits our least profitable ones. Considered as a whole, the season has been a profitable one for our farmers.

Dunstable (A. J. Gilson). — The price of corn this season will place the value of the crop above the normal. Root crops have given better than average yields. Fall seeding is in good condition. The prices for crops raised for market have ruled a little higher than in former years. Hay has been our most profitable crop, and potatoes our least profitable one. The man who has paid hired help and all other running expenses of a farm from the income of the farm must consider that it has been a profitable season for farming.

Chelmsford (Perley P. Perham). — The value of the corn crop is above the normal. Root crops have yielded very well. Farm stock is in good condition. Fall seeding made a good catch. Prices for all crops raised for market are much higher than the average. Apples are our most profitable crop, and potatoes our least profitable one. Considered as a whole, the season has been a good average one for the farmers in this locality.

Billerica (Geo. P. Greenwood). — Indian corn is 70 per cent of a full crop in value. Root crops are not quite up to the average. Farm stock is in good condition. Fall seeding is in fair condition. Prices for crops raised for market are somewhat higher than usual. The season has been peculiar; some farmers have found it a very good one, while others have failed to get full crops. Considering the scarcity of fruit, it must fall below the average.

Winchester (S. S. Symmes). — No Indian corn is raised here. Turnips are almost a total failure, but other root crops are good. Farm stock is in good condition. Fall seeding is in fine condition. Most crops sold higher than usual. Sweet corn has been our most profitable crop, and white turnips and lettuce our least profitable ones. Considered as a whole, the season has not been a profitable one for our farmers. The rains came so late that late turnips and celery did not have time to grow, the turnips being now no larger than acorns. Spinach is also very small.

Newton (G. L. Marcy). — Sweet corn only is raised, and it did not ear out, on account of dry weather. Root crops are not up to the average. Farm stock is in good condition, but not much kept. Fall seeding is in good condition. Prices for crops raised for market have ruled high. Crops harvested before July 1 have been profitable, and those harvested later unprofitable. The season has not been a profitable one, owing to bad weather, poor help and high prices of grain and hay. Many have sold more or less of their cattle, and milk is very short and growing shorter.

ESSEX COUNTY.

Salisbury (Wesley Pettengill). — Indian corn is about 75 per cent of a normal crop. Root crops are not up to the average. Stock is looking well, better than could be expected after the dry season. Not much fall seeding has been done. Prices for all crops have been good. Hay has been our most profitable crop, and potatoes our least profitable one. The year has been about an average one for profit, as prices have been good. The farmer who has a crop of apples this year is all right.

Groveland (A. S. Longfellow). — Indian corn is a good average crop. Root crops have turned out about as usual. Farm stock is in very good condition. Fall seeding is looking well. Rather better prices have prevailed for crops raised for market than in former years. Corn and hay have been our most profitable crops, and strawberries and peaches our least profitable ones. Considered as a whole, the season has not been as profitable as some years, on account of the small fruit crop and high prices of grain.

Andover (Milo H. Gould). — The value of the corn crop is above that of a normal crop. Potatoes did well. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market are higher than usual. Potatoes and cabbages have been our most profitable crops, and cucumbers for pickles our least profitable one. Considered as a whole, the season has been a profitable one for our farmers.

Topsfield (B. P. Pike). — No corn is raised except for the silo and sweet corn for the market. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market have ruled one-third higher than in former years. Hay has been our most profitable crop, and milk our least profitable product. Considered as a whole, the season has been a profitable one for our farmers.

Hamilton (Geo. R. Dodge). — Not enough corn is raised to base a valuation on. Root crops are good average crops. Farm stock is in good condition. Fall seeding was done very late, and is just coming up. Prices for farm crops have ruled a little higher than usual on most crops. Hay has been our most profitable crop, and early peas and cabbages our least profitable one. On the whole, the season has been a fairly profitable one for our farmers.

Wenham (N. Porter Perkins). — Corn is little raised except for the silo. Root crops have been average crops except carrots. Cows are looking well, but have been fed largely at the barn. As a rule, fall seeding is late, and has not started very much. Prices have been variable, but as a rule have been good. Sweet corn, cabbage, squash, parsnips, hay and apples have been our most profitable crops, and carrots, tomatoes, potatoes, milk and onions our least profitable ones.

If the winter market is good for crops not yet harvested, the season will be a fairly profitable one.

Danvers (Chas. H. Preston). — Indian corn is above the average in value. Most root crops have been below the average in value. Farm stock is in good condition. Fall seeding is in fair condition. Prices of crops raised for market have been considerably above average the first of the season. The season has been a profitable one for market gardeners, but not for dairymen.

NORFOLK COUNTY.

Cohasset (Ellery C. Bates). — The crop of Indian corn is below the normal in value. Root crops are not up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market have been about normal. Cauliflower has been our most profitable crop, and potatoes our least profitable one. Considered as a whole, the season has not been as profitable as in former years.

Randolph (Rufus A. Thayer). — The corn crop is about half of the normal in value. Root crops are not proving to be average yields. Farm stock is in good average condition. Fall seeding is not up to the average. Prices for crops raised for market have been better than average. Hay has been our most profitable crop, and winter squashes our least profitable one. Considered as a whole, the season has not been a profitable one for our farmers. On account of summer drought, many crops on high land failed to show any profit.

Canton (Edwin V. Kinsley). — The corn crop is about two-thirds of the normal in value. Root crops are not quite up to the average, but are better than was indicated. Farm stock is in very good condition. Fall seeding is in very good condition. Prices for crops raised for market have ruled high. Grass and winter cabbages are our most profitable crops, and tomatoes our least profitable one, there being much rot of the fruit. The season has not been a profitable one, as a whole, although recent weather conditions have aided the farmer very much.

Norwood (Frank A. Fales). — Indian corn is about a three-fourths crop in value. Root crops have been about half crops. Farm stock is looking very well at this time. Fall seeding is in good condition, but late. Prices for crops raised for market have been 25 per cent higher than usual. Corn has been our most profitable crop, and root crops our least profitable ones. The season has not been a profitable one, all crops being light except hay, which was more than an average crop.

Walpole (Edward L. Shepard). — The corn crop is about half a normal crop in value. Root crops are not giving good yields. Farm stock is about normal in condition. Fall seeding is fairly good. Prices for crops raised for market have been higher than usual. Hay has

been our most profitable crop, and potatoes and corn our least profitable ones. Considered as a whole, the season has not been a profitable one for our farmers.

Franklin (C. M. Allen). — Indian corn is about a three-fourths crop in value. Root crops are about 75 per cent of the usual average. Farm stock is in good condition. Fall seeding looks well. Prices for crops raised for market are more than average. Hay has been our most profitable crop, and apples our least profitable one. The cost of production has been very high this season, and profits very small.

BRISTOL COUNTY.

Mansfield (Wm. C. Winter). — Perhaps the corn crop is a third of the normal value. Root crops are very poor yields. Farm stock is in fair condition. Little or no fall seeding has been done. What little has been fit for market in the way of crops has brought somewhat higher prices than in former years. Hay and potatoes have been our most profitable crops, and corn our least profitable one. This has perhaps been the most unprofitable season in forty years, crops of all kinds being very poor.

Attleborough (Isaac Alger). — Indian corn is a two-thirds crop. Root crops are not up to the usual average. Farm stock is in good condition. Fall seeding is in fair condition. Prices have been 15 per cent higher than usual for the crops raised for market. Hay and strawberries have been our most profitable crops, and corn our least profitable one. Considered as a whole, the season has been a fairly profitable one.

Westport (Albert S. Sherman). — Corn did not give a very good yield. Root crops are not up to the average, turnips especially being small, scarce and a slim crop. Farm stock is in good condition. Fall seeding is not in first-class condition, as much of it was done late. Prices have been rather better than the average of former years. Hay is a good crop, and always in demand. Potatoes have been our least profitable crop. The season has been fairly profitable, but the late spring, dry summer and windy autumn have been against it.

Acushnet (M. S. Douglas). — There is a three-fourths crop of corn. Root crops are not up to the average. Farm stock is in good condition, and late feed has been plenty. Fall seeding is backward. Prices for crops raised for market have been rather above the average. Hay has been our most profitable crop, and potatoes our least profitable one. Considered as a whole, the season has been fairly profitable, although not up to the normal. Turnips especially are a short crop, and prices are high. Apples are very scarce. Late millet and barley did not get growth enough to cut before the frost took them.

Dartmouth (L. T. Davis). — Indian corn is about a two-thirds crop in value. Few roots harvested as yet, but they are below the average. Farm stock is in very fair condition. Early fall seeding looks

well; some later sown not up yet. Prices for crops raised for market have been somewhat above the average. As a whole, corn has been our most profitable crop. The season has not been a very profitable one, farmers not much more than holding their own.

PLYMOUTH COUNTY.

Brockton (Davis Copeland). — There is very little corn raised in this vicinity. Root crops are nearly up to the average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market have been somewhat higher than usual, but no more so than the price of labor. Hay has been our most profitable crop, and potatoes our least profitable one. Considered as a whole, the season has not been a very profitable one.

West Bridgewater (Clinton P. Howard). — Indian corn is not over three-fourths of a normal crop. Root crops are not quite up to the average. Young stock is in good condition. Fall seeding is looking well. There is an advance of from one-fourth to one-third in the price for most crops, making a gross return of about the same as last year on a larger crop. Sweet corn has been our most profitable crop, and beans our least profitable one. The season has been a profitable one for most of us.

Hanover (Harrison L. House). — The crop of Indian corn is a normal one in value. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops raised for market are rather higher than usual. Potatoes have been our most profitable crop, and corn our least profitable one. The season is fully up to the normal in profit, the higher prices having made up for the shortage in crops.

Marshfield (J. H. Bourne). — Taking into account the higher price of corn, the crop is 80 per cent of the normal in value. Root crops are not quite up to the average. Farm stock is in excellent condition, the late rains having given full feed. Fall seeding is coming on well. Prices for crops raised for market are 10 per cent higher than in former years. Hay has been our most profitable crop, and potatoes our least profitable one. Considered as a whole, the season has not been quite up to the average of profit for the last ten years.

Carver (J. A. Vaughan). — The corn crop is an average one in value. Root crops are up to the usual average. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops grown for market have been higher than usual. Cranberries have been our most profitable crop, and potatoes our least profitable one. Strawberries and cranberries, our money crops, were average yields and brought good prices; so, on the whole, the season may have been a profitable one.

Lakeville (Nathaniel G. Staples). — Indian corn is about a seven-eighths crop in value. Root crops are off 25 per cent from the average.

Farm stock is in fair condition. Fall seeding is in fair condition. Prices for crops raised for market have been somewhat better than in former years. Potatoes have been our most profitable crop. Considered as a whole, the season has been a profitable one for our farmers.

Wareham (A. B. Savary). — There is a normal crop of Indian corn. Root crops are below the average. Farm stock is in good condition. Fall seeding is in fair condition. Prices for farm crops have been rather better than usual. Cranberries have been about the only profitable crop. Most crops have been poor, owing to the dry summer. The season has not been a profitable one for our farmers.

BARNSTABLE COUNTY.

Bourne (David D. Nye). — Indian corn is about a normal crop. Root crops are not up to the usual average. Farm stock is in fair condition. Very little fall seeding has been done. Prices for crops raised for market have not been up to the usual average. Hay and cranberries have been our most profitable crops, and potatoes our least profitable one. Most farmers and gardeners have averaged about enough from crops to hold their own.

Falmouth (D. R. Wicks). — Corn as a whole is up to a normal crop. The root crops are average where they were sufficiently advanced to stand the drought, but there were few planted. Farm stock is in good condition, as there is plenty of fall feed. Fall seeding is doing finely. Crops have all brought better prices than usual. Hay has been our most profitable crop, and potatoes our least profitable one. With the prices received, the season must have been a profitable one.

Barnstable (John Bursley). — Indian corn is within 5 per cent of a normal crop in value. Root crops are not up to the usual average. Farm stock is in very good condition. Fall seeding is small and backward. Prices for crops raised for market have been higher than usual, but no more so than farm labor, feed, etc. Cranberries have been our most profitable crop, and Cape turnips our least profitable one. Considered as a whole, the season has been a profitable one for our farmers.

Dennis (Joshua Crowell). — The corn crop is not over two-thirds of the normal in value. Root crops are not up to the usual average. Farm stock is in fair condition. Fall seeding is fairly good, but there has been but little done. Prices as a whole are higher than usual. There is not much profit in any crop this year. The cranberry crop has perhaps been the most disappointing of any, as more people depend upon that than upon any other. The season as a whole has been a discouraging one.

Harwich (Ambrose N. Doane). — The corn crop is about normal in value. Root crops are up to the usual average. Farm stock is in fair condition. No fall seeding has been done to speak of. Prices

for farm crops have been much higher than in former years. Cranberries have been our most profitable crop, and potatoes our least profitable one. Outside of the cranberry crop, the season has not been a profitable one, all kind of vegetables being failures except corn.

Eastham (J. A. Clark). — Indian corn is an average crop, but there was not much planted. The prospect is fairly good for the turnip crop, which is the principal root crop grown. Farm stock is in good condition. Fall seeding is in fair condition. Asparagus has been our most profitable crop. The season will prove fairly profitable; mid-season crops were a partial failure, but asparagus, our leading early crop, was good, and turnips, our late crop, are turning out fairly well.

DUKES COUNTY.

West Tisbury (Geo. Hunt Luce). — The corn crop is above the average in value. Root crops are about average. Farm stock is in good condition. Not much fall seeding has been done here. Prices for market crops are much higher than usual. Corn has been our most profitable crop, and potatoes our least profitable one. Considered as a whole, the season is a fairly profitable one for our farmers.

NANTUCKET COUNTY.

Nantucket (H. G. Worth). — The corn crop was never better. Root crops are up to the usual average. Stock is in fine condition. Not much fall seeding has been done. Prices for crops raised for market are fully up to former years. Hay has been our most profitable crop, and oats our least profitable one. The season has been a very good one for our farmers.

BULLETIN OF

MASSACHUSETTS BOARD OF AGRICULTURE.

GREENHOUSE PESTS AND THEIR CONTROL.

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The value of crops raised under glass in Massachusetts is increasing each year, and new houses are continually being added to those already in use. Two classes of products are obtained in this way, — flowers and other ornamental plants, and vegetables which during some portions of the year could be produced out of doors, but which when raised out of season command high prices.

Both of these classes of crops, if they may be called such, occasionally suffer severely from the attacks of insects of various kinds, some of which may cause injury to but one kind of plant, while others may affect nearly everything. Losses resulting from the presence of injurious insects in greenhouses are frequently large, and little is generally known as to methods of preventing them. Many kinds of insects may be found at work at different times, and unless the grower knows what the insect is with which he has to deal, he is uncertain as to the proper treatment, for it is now becoming quite generally understood that the nature of the treatment depends to a large degree at least upon the kind of insect to be controlled.

On forcing crops, plant lice, the white fly, thrips and occasionally cutworms, snails and other pests appear. On florists' crops these insects and scales are also too often in evidence. Accounts of some of these pests, and reliable methods for their control, follow.

PLANT LICE.

There are many different kinds of plant lice or aphids, most of which are green in color, and are frequently called "green fly." A black species known as the "black fly" is common on chrysanthemums, and a brown species occurs on violets. All kinds of plant lice, however, suck the juices from the leaves, tender stems and flower buds of the plants they are on, and in this way check the growth, blight the blossoms, and if sufficiently abundant kill the plants. They multiply rapidly, the young being generally brought forth alive, and at first clustering around the mother, sucking the sap from the plant. But after a few days, when more young appear and this region becomes too crowded, they move away to other parts of the plant and continue their feeding.

The mother louse (in one species at least) produces from four to sixteen young every two or three days until about two hundred have thus appeared, and when these young have fed till full grown they in

turn begin to produce young. After a few generations of this nature another generation is produced, the members of which develop wings and are thus able to fly to other plants and start new colonies. In this way an entire greenhouse may in a short time become infested from a single originally infested plant.

With most kinds of plant lice a generation finally appears which consists of males, and females which lay eggs, these hatching and producing females which start new colonies; but the egg-laying generation has not been observed in all cases.

The White Fly. (*Aleyrodes vaporariorum* Westw.)

This pest has been a very serious one in Massachusetts during the last ten years, often destroying entire crops of tomatoes, cucumbers, etc. In one case seen by the writer a crop of tomatoes valued at $4,000 was entirely lost, the vines drying up completely just as the fruit began to ripen.

The adult fly is a tiny, white-winged insect, with a yellow body, flying quite freely when disturbed, and resting on the plants, chiefly on the under side of the leaves. The eggs, which are too small to be seen without a magnifying glass, are laid there, and the young suck the juices from the leaves. The young are very small, almost transparent, lie flat against the surface of the leaf, and are very inconspicuous. As they feed, the leaves gradually turn brown, and wither when the insects are abundant.

From the time the eggs are laid till adults from them appear is about forty days, so that there is plenty of time in most cases for several generations to develop while a single crop is being grown.

Thrips.

Several kinds of thrips are found in greenhouses, but the most common species is the onion thrips, which is often a serious pest to field onions. It is a slender insect, about one-twentieth of an inch long, yellowish brown, and winged. The eggs are probably laid in the tissues of the stems or leaves of the plants. The young which hatch from the eggs resemble the adult, but are smaller and without wings.

These insects, both as young and adults, suck the juices of the plant they are on, the damage they cause being in proportion to their abundance. Each female probably lays about fifty eggs, and the adults from these eggs appear in about three weeks, thus enabling this pest to increase rapidly in numbers unless held in check by some method of treatment.

When the thrips work on the leaves, small spots where the sucking has taken place soon turn brown, giving the leaf a speckled appearance. On flower buds small pale blotches soon show on the petals, spoiling the blossoms. The cucumber and carnation are perhaps the most usual food plants of this insect in the greenhouse.

Cutworms.

Cutworms are the caterpillars of a group of moths known as *Noctuidæ*, the caterpillars feeding in a variety of ways, though many — perhaps most of them — attack the stems of succulent plants at or near the surface of the ground, and by feeding at one spot "cut" off the stem at that point.

Cutworms usually get into the greenhouse by being brought in with the soil, so that if this has been sterilized properly they are not likely

to be present, though in some cases it is possible that the moths may enter through open ventilators and lay their eggs, from which the cutworms will hatch.

The cutworms usually feed at night, burrowing into the ground during the day time; and the first indication of their presence is the discovery of wilting plants, which examination shows to be due to a more or less complete "cutting" off of the stem.

Sometimes the easiest way to remove these insects is to dig up the soil around the injured plants and find and destroy the worms while they are quiet in the day time; sometimes a careful examination in the evening by the light of a lantern will reveal them at work; but when neither of these methods is practicable, for any reason, a poisoned mash may be made use of. To prepare this, take sixty pounds of bran or middlings, molasses enough to sweeten well, one pound of Paris green, and water to make a dough or mash. Mix thoroughly, and place a little beside the stem of each plant late in the afternoon. The cutworms coming up to feed at night will find in this mash something which they prefer to the plants, and will be poisoned by it. Smaller amounts than those given above can easily be prepared, using the different materials in their proper proportions.

Snails.

These pests of course are not insects, but are so often troublesome that they are included here. They are really shells, but forms which appear to have nearly or quite lost their shelly covering. They conceal themselves under boards, pieces of bark or elsewhere during the day, and feed at night. As they move along, large amounts of slime or mucus are poured out to aid them in travelling, and this can be taken advantage of in destroying them. Sometimes it is possible to surround plants attacked by snails with air-slaked lime, which kills the animals when they attempt to cross such bands toward the plants. If for any reason it is not wise to use the lime, similar bands of dry bran may be used, the animal in trying to cross such material soon exhausting its supply of slime and becoming covered by the bran, being rendered helpless and unable to move. Bran used in this way, however, is successful only as long as it is dry, and when it becomes wet must be replaced by a new supply.

Red Spiders.

These common pests are also not insects, but are mites, having eight legs when adult, instead of six. They vary in color from yellowish to dark brown, and sometimes have a greenish tinge.

The red spiders spin a very delicate web, beneath which they live, the web being difficult to see. They are most plentiful near the midribs on the under side of the leaves, where they may frequently occur in large numbers, sucking the plant juices. They move about freely, however, and may travel some little distance in a short time.

Their list of food plants is a long one, including tomatoes, cucumbers, carnations, roses, violets, and in fact most ornamental plants, which they injure to varying degrees according to their abundance. The eggs are deposited on the under side of the leaves, about five on an average being laid per day, till each female has laid about a hundred. These eggs hatch in three or four days in the warmest weather, but in cold weather this may be delayed to about two weeks. It is probable that from the time an egg is laid till the mite becomes adult requires between three and four weeks.

The Hemispherical Scale. (*Saissetia hemisphærica* Targ.)

This is usually the most common soft scale found in greenhouses. It is a brown "lump" in form, rather less than a fifth of an inch long, and nearly as broad, and is found on many kinds of plants though most abundant on palms, ferns and cycads. It locates both on the leaves and stems, and in Massachusetts seems to be particularly abundant on the Boston fern. Its life history does not seem to have been completely worked out, but it probably breeds at all seasons of the year, laying eggs which hatch into rather flat, pale-colored young.

The Soft Scale. (*Coccus hesperidum* Linn.)

This scale is similar to the last, but the young are apparently born alive. It feeds on citrus plants, oleanders and many other greenhouse plants.

The White Scale. (*Aspidiotus hederæ* Vall.)

The white scale has also quite a list of food plants, but is perhaps as abundant on the ivy, palms and croton as any in Massachusetts greenhouses. It is quite flat, having only a slight elevation at or near the center, is circular in outline, and is white or light gray in color, sometimes with its central elevation orange-yellow. It lays eggs from which adult scales are produced in about two and a half months, but the different generations run into one another, so that almost all stages may be found at any time.

Morgan's Scale. (*Chrysomphalus dictyospermi* Morg.)

This important pest on palms is circular in outline, dark colored, usually with an orange spot near the center, and is quite flat, projecting only very slightly from the leaf. The young are born alive, and males are unknown. There are several generations in a year, but, as was stated for the white scale, these run into each other or overlap.

Mealy Bugs.

Two kinds of mealy bug are met with in greenhouses, the more common one having a fringe of spines around the body, the two at the hinder end being somewhat longer than the others. In the less common kind these hinder spines are much longer, — sometimes as long as the body. In both the body is more or less covered with a white, waxy substance, which has been the cause of their receiving the name "mealy bugs."

The several hundred eggs laid by the female are carried under the hinder end of the body, and as these are laid the insect tips upward till it is almost standing on its head. When egg laying has been completed the parent dies, and after about two weeks' time from the laying of the first eggs these hatch. The newly hatched young are quite small, not covered with the wax, and after a time they move about and begin feeding, which continues for six or eight weeks before they become adult, sucking the juices from the plants they are on.

Mealy bugs feed on many plants, but perhaps the oleander, coleus, some palms and citrus plants are preferred members of the list.

Methods of Control.

The widely differing life histories and habits of the various insects found in greenhouses prevent the use of any single method for their control. The treatment in each case must depend upon the kind of insect to be treated, and in many cases as well upon the kind of plant it is on. For some plants the cultural methods necessary to obtain the best results are those most favorable to the increase of their insect pests, while with others a treatment strong enough to destroy all the pests would certainly destroy or at least seriously injure the plants.

Preventive Measures.

It is almost needless to state that an empty greenhouse should have no pests present, and this will be the case if the house has been thoroughly cleared out and then fumigated, directions for which are given below.

The first step in starting a new crop in a house is to be certain that no pests are brought in with the soil. This can be made sure of by sterilizing the earth thoroughly. Probably cutworms are the insects most likely to be brought in with the earth, and they have located in this while it was outside. Therefore, early in the season select the soil to be used, and throw it into piles. If no grass or other vegetation is allowed to grow on such piles, no cutworm eggs will be laid there, and any cutworms present will go elsewhere in order to get food. In this way where sterilization is impossible at least a considerable degree of protection against the introduction of pests with the soil can be secured.

If the new plants are to be started in pots, these should be fumigated with the house while it is empty. If the plants themselves are grown from seed, they should be free from pests. The real danger under these conditions would be either that the fumigation of the empty house was not sufficiently thorough, or that pests might be brought in on cuttings or in some such way, and spread to the originally clean plants.

All cuttings or potted plants brought into a clean house should be themselves fumigated, or at least dipped into a solution of one pound of laundry soap in a gallon of water for a few moments. The pots should also be thoroughly washed with the soap, as many pests feeding on the plants are often found on the pots as well. Where scales are present on the plants this treatment is not usually a success, and their fumigation must be resorted to.

Treatment for Houses already infested.

Syringing with water is of some value for this purpose, if the pressure of the water is sufficient to knock the insects off the plants. Many of the insects crawl back afterwards, however; many are not removed; and many others are not even reached at all by this method, which must be repeated at least once or twice a week. Frequently the amount of water it is necessary to use for effective results in this way is injurious to the plants, the liability of the carnation to develop rust when too much water is used being an example. For these reasons, therefore, the use of water as an insecticide in greenhouses is not particularly desirable where better methods can be employed, unless the plants concerned can stand considerable water, as much more of this is necessary than would be the case in ordinary watering.

Fumigation with tobacco is perhaps the most widely used method for the control of greenhouse pests. Either the leaves and stems or some prepared material having tobacco or at least nicotine as its basis is burned in the house, and the fumes are relied upon to destroy the insects present.

Where the leaves and stems of the tobacco, or where tobacco punk or tobacco fumigating paper are used, they are usually placed in pans on the floor and burned slowly, in order to produce as dense a smoke as possible. As the punk and fumigating papers are stronger, they give better results than the stems and leaves, though more expensive than these last.

Certain tobacco extracts are also on the market under various trade names, and, as they contain fixed strengths of nicotine, are more reliable in their actions than ordinary tobacco stems, in which the amount of this narcotic varies considerably. They are usually diluted with more or less water and then heated, producing a vapor which spreads through the house. The objection to these substances is that it is often inconvenient or impossible to vaporize them rapidly enough to obtain a density of vapor sufficient to produce the desired effect.

The insects most successfully controlled by fumigation with tobacco are plant lice, and, when vaporization is successful, some of the thrips. It does not seem to kill all the plant lice, however, for others soon appear, evidently derived from some which had escaped the treatment. The white fly adults are temporarily affected by it and fall to the ground, but most of them soon recover. Red spiders, mealy bugs and scale insects are but little affected.

Fumigation with sulfur will undoubtedly destroy insects when the fumes are strong, but unfortunately they also seriously affect the plants. For that reason, then, this method of treatment cannot be considered of value in greenhouses.

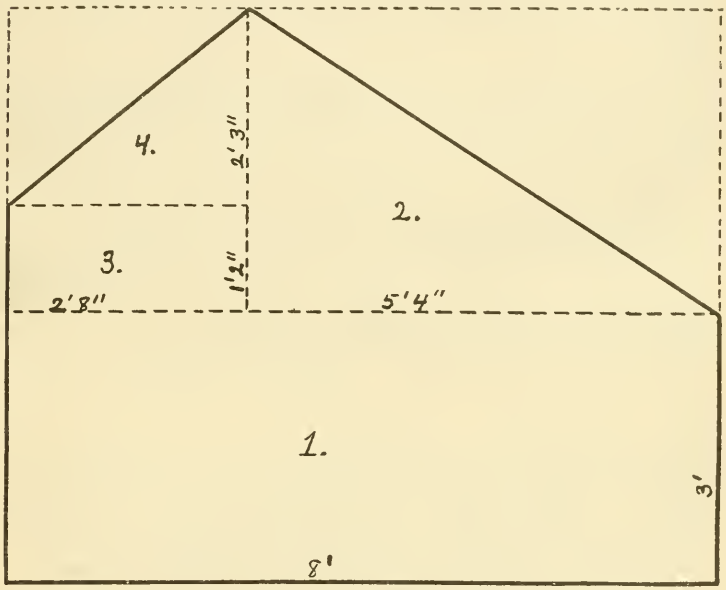
Fumigation with carbon disulfid has been but little tested in greenhouses, the weight of the gas causing it to settle rapidly. A few tests of it for thrips on tomato plants indicate that, used at the rate of one cubic centimeter to each cubic foot of space, the insects would all be destroyed without injury to the plants; but this treatment would probably be successful only on very low plants, placed on the floor of the place to be fumigated, while if enough of the disulfid should be used to reach higher plants the gas would be likely to become so dense lower down as to cause injury. Its use, therefore, can hardly be advised without more knowledge of its capabilities.

Fumigation with hydrocyanic acid gas is certainly the most effective treatment thus far discovered; but the gas is a most deadly one, and for this reason many are afraid to use it, and a hearty respect for its powers is a feeling which should be encouraged. If proper care be taken, however, it can be used with safety; and the only other drawback it has is our ignorance as to how much can be used without injury to the plants exposed to its fumes. This subject is now being investigated at the Massachusetts Agricultural Experiment Station, and the maximum strength of fumigation without injury to the plants has been determined for the more common greenhouse varieties of tomato and cucumber at all ages and under different conditions of light, temperature, moisture, etc., and the experiments will be extended to other plants as rapidly as possible.

To fumigate with hydrocyanic acid gas, potassium cyanide, commercial sulfuric acid and water, besides a dish or dishes considerably larger than is needed to hold these materials, are necessary. The

dishes must not be of metal, though granite ware, if without any flaws inside, will prove satisfactory. Earthen crocks or jars are often used, and answer well for the purpose unless the heat produced by mixing the sulfuric acid and the water causes them to crack, which sometimes happens when the two are mixed too rapidly.

Before fumigating, the number of cubic feet in the house (not counting out the space taken by plants and benches) must be known, and in many cases to calculate this has puzzled those in charge. The best way to get this is to draw the house in cross-section, and then divide this into squares and half squares or rectangles, as shown in the diagram, which is drawn to the scale of a half inch to a foot. In this diagram, the dotted lines show how the house plan has been divided and the measurements of each part are given. The area of block



No. 1 would be 24 feet (3 by 8); that of No. 2 would be so little over 9 feet that the fraction may be ignored (5 feet 4 inches by 3 feet 5 inches, and the answer divided by 2, only half of the rectangle being present); that of No. 3 would be very slightly over 3 feet; while that of No. 4 would be 3 feet. The entire number of square feet in a cross-section of the house, then, would be 39. If this be multiplied by the length of the house inside in feet, the number of cubic feet will be the result.

Fumigation to ensure that no insects are in an empty house can and should be much stronger than where plants are present. An ounce of potassium cyanide to every hundred cubic feet would be sufficiently strong for this purpose, and the fumigation can be given in the day time, — something which would be impossible if plants were being treated.

The method followed in fumigating is the same, whether plants are

present or not, only the strength of the fumigation, the time of day and the time the house is closed differing in the one case from the other.

To fumigate an empty house, weigh the right amount of cyanide on quite accurate scales. This amount should be known in ounces and fractions of an ounce. Then, with such a measuring glass as is used by druggists and photographers, measure out twice as many ounces and fractions of commercial sulfuric acid as there were of cyanide. Thus, if the amount of cyanide for the house, using an ounce to every hundred cubic foot, was 3¼ ounces as weighed on the scales, 6½ ounces of the sulfuric acid should be measured out in the measuring glass. The water should now be measured out in the glass, taking twice as much as was taken of the acid, or — in the example just given — exactly 13 ounces by measure. From this it is evident that, starting with the cyanide, twice as much sulfuric acid and four times as much water are taken, the last two being measured, however, rather than weighed.

As a matter of convenience, it is easier to measure the water before the acid, and put the water in the fumigating dish; then measure out the acid and pour it *very slowly* into the water, to avoid the production of much heat; then all that remains is to add the cyanide.

Before doing this have all ventilators and other openings in the house tightly closed, but so arranged that some of them at least can be opened from the outside. If the house is not very tight, rags should be forced into the cracks, an old case knife being often very convenient for this purpose. Finally, when all is ready, the cyanide, which should be in a very loose paper bag or on a piece of thin cloth, should be taken, cloth or bag and all, and dropped into the dish, the operator at once running as quickly as possible to an exit from the house, which he must then close as tightly as possible.

If no plants are in the house, the longer it is before the doors and ventilators are opened the more certainly will all insects there be killed. Several hours or even a day, then, is none too long for this purpose, and the least time taken should be at least three hours. When the fumigation has been completed, open the doors and ventilators from outside, and let the house air for at least an hour before entering it. The house may now be considered ready to start plants in.

Where plants are already in a house, and fumigation is necessary, the same general method is followed, but with a few changes.

It has been found that fumigation in the day time is much more likely to injure the plants than at night, though the reason for this has not been discovered. Then different plants differ in the strength of the fumes which they can stand without injury, and this must be taken into consideration. In some cases if the gas be used strong enough to kill all the insects present the plants will be seriously injured, and it is necessary in such cases to use it weaker than is desirable, and repeat the fumigation oftener.

Where a house is filled with but one kind of plant, the problem how strong the fumigation can safely be made is much easier than where many kinds are present. But just how much gas any plant can stand under all conditions has not been ascertained, nor even whether a strong treatment for a short time or a weak treatment for a long time is the safer. For tomatoes it has been found at the Massachusetts Experiment Station that one-third of an ounce of cyanide to every thousand cubic feet of house for forty minutes at night is safe for the plants and quite effective against the white fly. In Maryland three-fourths of an ounce per thousand cubic feet, the exposure to

the gas continuing over night, caused no injury; but it is probable that the house used for these tests was not as tight as the Massachusetts one, as this strength injured the plants in this State.

It is necessary to be sure of the quality of the cyanide used in fumigation. Most drug stores carry a grade of about 50 per cent strength; but it is necessary to obtain the 98 to 99 per cent strength, to be at all certain of results. This should be obtained in one pound sealed cans, which state the strength on the outside, and which should not cost over 50 cents per pound. The commercial grade of sulfuric acid is as good as is needed, and its costs should not be more than 10 cents per pound. From this it can be seen that fumigation with cyanide is not an expensive process.

At the present time our knowledge is not sufficient to enable us to use the gas strong enough to kill all the insects. A single fumigation well below the point of danger to the plants will kill the plant lice, most of the white fly, thrips, and some of the mealy bugs. Against their eggs, however, and against most scale insects, it is of little value. But the eggs will soon hatch, and a repetition of the treatment will then reach the young which hatched after the first fumigation. In practice it has been found that fumigation with one-third of an ounce of cyanide to each thousand cubic feet in the house, repeated three times at intervals of twelve to fourteen days, will practically free a house from insect pests except scales and red spiders.

This holds good for tight houses only. If the house is loose and much of the gas becomes quickly lost, larger amounts must be used, but how much larger these may be will depend entirely on how loose the house is.

Where the house is a long one, it is well to divide the charge into two or more equal parts, and start the fumigation at the jar farthest from the door; then drop the other charges of cyanide into their jars as these are passed on the way out.

Dipping.

Dipping wherever this is possible is much better than spraying, as the entire plant is reached, while this is practically impossible by spraying. As only potted plants can be dipped, however, it is often necessary to resort to spraying instead.

Tobacco water, made by steeping tobacco leaves and stems in hot water, is a good insecticide for plant lice, mealy bugs and thrips, but weak solutions are far from effective. The use of laundry soap also gives good results, though for many plants more than four ounces per gallon of water is not safe for the plant, while ineffective against the insects. As a general thing, though, it would be well to try the soap before resorting to tobacco water.

For scale insects laundry soap is usually too weak to be of much value, and whale-oil soap must be used. Fortunately, most cycads, palms and citrus plants can withstand this when used even as strong as one pound per gallon of water, though ferns are injured by such a strong solution.

To dip potted plants rapidly, a tall can filled with the soap is a great convenience, particularly if as tall as are the plants to be dipped. Turn the plant bottom up and plunge it into the can till the wash reaches the bottom of the stem, and hold it there a few moments, then remove it and let it drain before putting it back in its place. In some cases it may seem advisable to wash the plant with clean water after a few hours.

For red spiders, fumigation with tobacco and hydrocyanic acid gas are at best only partially successful. But where the plants can stand it, flowers of sulfur, mixed with water at the rate of an ounce to a gallon, sprayed over them is quite effective. With plants affected by the sulfur it has been found that a 5-cent cake of castile soap dissolved in about six gallons of water forms a spray which gives good results. This spray should be allowed to stay on the plants for two or three hours, after which it should be removed by syringing with clean water. Two or three treatments with castile soap in this way will greatly reduce the number of the red spiders.